FACT SHEET / STATEMENT OF BASIS
JORDAN VALLEY WATER CONSERVANCY DISTRICT
SOUTHWEST GROUNDWATER TREATMENT PLANT
NEW PERMIT: DISCHARGE
UPDES PERMIT NUMBER: UT0025836
MAJOR INDUSTRIAL

1.0 FACILITY CONTACTS

Person Name: Richard Bay
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Facility Name: Southwest Groundwater Treatment Plant
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2.0 SUMMARY

The Jordan Valley Southwest Groundwater Treatment Plant is being constructed to provide drinking quality water to several communities in the Southwestern part of the Salt Lake Valley by treating a combination of deep groundwater impacted by historic mining activities and shallow groundwater unaffected by mining impacts.

This project is part of a larger Natural Resource Damage Claim (NRDC) filed in1986 by the State of Utah under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980) against Kennecott Utah Copper for damages to the deep ground water in the Southwest Salt Lake Valley due to historic mining practices. The impacted deep aquifer is referred to as Zone B in NRDC settlement discussions.

The treatment process utilized at the Southwest Groundwater Treatment Plant is reverse osmosis. Reverse osmosis is a process in which total dissolved solids (salts) are removed from a solution (such as water). This is accomplished by pushing water through a semi-permeable membrane. The membrane allows only the water to pass through with a small percentage of the dissolved salts and other contaminates. The majority of the dissolved salts and other contaminates will be removed by the membrane and collected in the byproduct waste stream. During normal operations, treatment will result in three streams from the Southwest Groundwater Treatment Plant: drinking quality water that will be distributed through Jordan Valley's existing system, excess untreated shallow groundwater that will be discharged to the Jordan River via Outfall 002 and a byproduct stream containing concentrated dissolved salts and trace metals that are proposed to be discharged from Outfall 001 to Gilbert Bay of Great Salt Lake via a 21 mile byproduct pipeline.

The draft permit contains effluent limitations for discharges to the Jordan River and Great Salt Lake from the Southwest Groundwater Treatment Plant. The effluent limitations for Outfall 002 to the Jordan River are based upon existing water quality standards. Because there are no numeric water quality based standards for Great Salt Lake or its Transitional Waters, the Division of Water Quality has adopted the use of a weight-of-evidence approach to ensure that the Narrative Standard, as specified in *UAC R317-2-7.2,* and the associated beneficial uses of Gilbert Bay and the Transitional Waters will be protected with the addition of this discharge from

Outfall 001. A weight-of-evidence approach utilizes multiple lines of reasoning and analysis in order to determine the best and most supportable result or conclusion.

The Antidegradation Level II Review, completed in 2010 for Outfall 001 to Great Salt Lake, identified selenium as a parameter of concern because byproduct concentrations will be greater than ambient in the receiving waters. The antidegradation review also identified mercury as a parameter of concern because of its biomagnification potential. Biomagnification is the process whereby the tissue concentrations of a contaminant increase as it passes up the food chain through two or more organisms. The Division of Water Quality established effluent limits for these parameters with extensive monitoring requirements at Outfall 001 based upon a modification of the USEPA (2010) Methylmercury Implementation Guidance.

3.0 DESCRIPTION OF FACILITY

The Southwest Groundwater Treatment Plant is owned and operated by the Jordan Valley Water Conservancy District (Jordan Valley). The plant is located near Jordan Valley's headquarters, adjacent to the Jordan River, at 8215 South 1300 West.

The Southwest Groundwater Project will remediate deep groundwater contaminated from historic mining activities in southwest Salt Lake County. This project will improve groundwater quality and prevent further contaminant migration in the Salt Lake Valley. The project will extract mining-impacted groundwater with elevated total dissolved solids (salts) via a series of deep aquifer wells and purify the extracted water utilizing a reverse osmosis treatment process at the Southwest Groundwater Treatment Plant. The project will also extract shallow groundwater with elevated total dissolved solids. This shallow groundwater has not been impacted by mining activities. The hydrologic system in the Salt Lake Valley results in groundwater being discharged naturally to the Jordan River. Accordingly, the water quality of the Jordan River reflects the quality of the groundwater commingled with base flow from Utah Lake.

The drinking quality water generated will be distributed by Jordan Valley to its member agencies for supply to their drinking water systems. Reverse osmosis byproduct water (i.e. concentrate), containing the extracted salts from the treated water, will be routed via a 21 mile pipeline to Outfall 001, which flows through the Transitional Waters of Great Salt Lake's Gilbert Bay and ultimately into Gilbert Bay. Initially, the Southwest Groundwater Treatment Plant will have a capacity of producing seven million gallons per day of treated drinking quality water and will discharge a maximum of 1.5 million gallons per day of byproduct. At ultimate build out, the treatment plant capacity will increase to 14 million gallons per day of drinking water with 3 million gallons per day of byproduct to be discharged.

Normal discharges under this permit will be of reverse osmosis byproduct via Outfall 001 to the Transitional Waters and Gilbert Bay and excess feed water to the Jordan River via Outfall 002. Limited intermittent start-up flows from deep and shallow wells will be discharged through municipal storm drain systems at various times to the Jordan River and the Utah and Salt Lake Canal. Discharges of water from the shallow aquifer eventually reach the Jordan River, due to the fact that the natural flow pattern of the shallow aquifer is to the Jordan River. Discharges of mining contaminated groundwater from the deep aquifer wells to municipal storm drains will not be allowed, except intermittently upon start-up as described in section 4.2.

4.0 OPERATING CONDITIONS

The following is a description of the various operating and discharge conditions that will occur at the facility.

4.1 Normal Operations

The Southwest Groundwater Treatment Plant will operate three rows of membranes, two for treating water from deep aquifer wells, and one for treating water from shallow aquifer wells. Each of these three sets of membranes is called a "treatment train." Under normal operating conditions, the Southwest Groundwater Treatment Plant will operate all treatment trains, the byproduct water will be discharged to Gilbert Bay and drinking quality water will be delivered to Jordan Valley's member agencies.

On a near continuous basis, the Southwest Groundwater Treatment Plant will need to discharge excess feed water from pressure relief valves of the shallow aquifer treatment train to the Jordan River, in order to supply feed water to the plant at a constant pressure and flow. The shallow aquifer has not been impacted by historic mining practices. It is expected that the flow will average 1 million gallons per day most days of the year. The excess flows from the pressure relief valves for the deep aquifer (groundwater impacted by historical mining practices) treatment trains will be discharged to the Transitional Waters and Gilbert Bay via the by-product pipeline.

4.2 Pump to Waste Start-Up Condition

The Southwest Groundwater Project includes shallow and deep aquifer wells. When these wells are initially started up, the water may contain a small amount of sediment also known as suspended solids. A process called "pump to waste" is used to discharge this water so that the sediment doesn't make it to the Southwest Groundwater Treatment Plant where it would likely damage the membranes used in the reverse osmosis process. These wells will pump to waste intermittently at start-up of the well pump, to purge the well casings of suspended solids after shut down and before pumping the water to the Southwest Groundwater Treatment Plant. It is intended that the wells will pump and supply feed water to the project on a near continuous basis. The start-up conditions are expected to be limited, only occurring each time a well is started up. The wells will pump to waste at their individual locations to the respective municipal storm drain system(s) which flow to either the Utah and Salt Lake Canal or the Jordan River.

Based on wasteload analysis completed for each well location, it is expected that these discharges will not cause or contribute to a violation of water quality standards and therefore will not have effluent limits associated with the discharges. Reporting of duration and frequency of each discharge will be required. The reporting of these discharges will be provided to the Division of Water Quality (DWQ) in an annual project operating report.

4.3 Cleaning and Maintenance Conditions for the Shallow Aquifer Wells

The Southwest Groundwater Treatment Plant requires routine cleaning and maintenance. Under this maintenance condition, which will occur no more than 90 days each year, the feed water from the shallow wells will be diverted to the Jordan River and will not enter the Southwest Groundwater Treatment Plant. Under these maintenance conditions, the feed water from the deep aquifer wells will be discharged to the Transitional Waters and Gilbert Bay via the byproduct pipeline.

The total flow to the Jordan River of the combined discharges from cleaning, maintenance and pressure relief conditions will not exceed a maximum of 4.6 million gallons per day. A wasteload calculated for the shallow well discharges to the Jordan River under these conditions show that the effluent will not cause or contribute to a violation of water quality standards.

4.4 Upset Conditions

In the event of a power outage at the Southwest Groundwater Treatment Plant, the portion of the deep well water that exceeds a concentration of 1,200 mg/L TDS will be directed to Outfall 001 and discharged to the Transitional Waters and Gilbert Bay. Shallow groundwater will be discharged to the Jordan River via Outfall 002. Deep wells which have been identified to contain TDS concentrations less than 1,200 mg/L will be discharged at the well sites to the respective municipal storm drain(s).

4.5 Discharges to the Jordan River

Discharges of shallow groundwater to the Jordan River will occur under well start-up, maintenance, upset and normal operating conditions. Since the Jordan River is currently impaired for TDS, it is required by *UAC R317-8-2.2* that the discharge will not cause or contribute to a violation of water quality standards. Based on wasteload analysis conducted for each well, these discharges will not cause or contribute to a violation of Utah's water quality standards.

5.0 DISCHARGE

5.1 Description of Discharge

Outfall	Description of Discharge Point
001	Located at latitude 40°45'37.59"N and longitude 112°10'13.32"W. This outfall will convey byproduct and excess untreated groundwater from the deep aquifer. The discharge is through a 16-inch diameter pipe directly to the Transitional Waters and Gilbert Bay of the Great Salt Lake. The compliance monitoring point is at the Southwest Groundwater Treatment Plant prior to effluent entering the 21 mile byproduct pipeline. (Except for end of pipe monitoring as required in *Part I.D. Self Monitoring and Reporting Requirements, Footnotes b/ and e/* of the UPDES permit.)
002	Located at latitude 40°36'5.58"N and longitude 111°55'13.37"W. The discharge will consist only of untreated shallow aquifer groundwater that has not been impacted by

historic mining activities. The discharge is through a 30-inch diameter pipe from the river discharge vault at the Southwest Groundwater Treatment Plant to the Jordan River.

5.2 Receiving Waters and Stream Classification

The final discharge is of reverse osmosis byproduct and excess deep aquifer feed water to the Transitional Waters and Gilbert Bay via Outfall 001. Discharges of untreated shallow groundwater will occur to the Jordan River via Outfall 002 based upon plant operations.

Gilbert Bay of Great Salt Lake, the ultimate receiving water for Outfall 001, is classified as Class 5A. The Transitional Waters along the Shoreline of Great Salt Lake are classified as 5E. The Jordan River, the receiving water for Outfall 002, is classified as Class 2B, 3A and 4.

Class 2B	-Protected for secondary contact recreation such as boating, wading, or similar uses.
Class 3A	-Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
Class 4	-Protected for agricultural uses including irrigation of crops and stock watering.
Class 5A	-Gilbert Bay of GSL. Protected for frequent primary and secondary contact recreation, waterfowl, shore birds and other water-oriented wildlife including their necessary food chain.
Class 5E	-Transitional Waters along the Shoreline of GSL geographical boundary. Protected for infrequent primary and secondary contact recreation, waterfowl, shore birds and other water-oriented wildlife including their necessary food chain.

5.3 Effluent Limitations and Basis for Effluent Limitations

Effluent limits for the Southwest Groundwater Treatment Plant are based on Utah Secondary Treatment Standards, Utah Water Quality Standards, and best professional judgment (BPJ) (see explanation of BPJ in section 5.3.1).

The DWQ's review of the proposed discharge to the Transitional Waters and Gilbert Bay has identified selenium and mercury as the only two constituents of concern. As discussed in the Level II Antidegradation Review for Outfall 001, the only pollutants of concern that could degrade water quality are mercury and selenium. Degradation occurs when effluent concentrations are higher than the receiving water. DWQ concluded that the requirements of the Narrative Standard are met for all pollutants in the effluent present at concentrations less than ambient. No evidence exists that the existing concentrations of these pollutants are impairing the uses of Gilbert Bay or the adjacent Transitional Waters. The Whole Effluent Toxicity (WET) testing requirements of this permit provide additional assurance that the Narrative Standard will be met.

The evaluation summarized in the following paragraphs, are based on the rationale presented in appendix one, *Jordan Valley Water Conservancy District Southwest Groundwater Treatment Plant Outfall 001 FSSOB Supporting Information for Selenium and Mercury*. Both selenium and mercury have the potential to adversely affect aquatic and aquatic-dependent wildlife in both Gilbert Bay and the Transitional Waters (mudflat wetlands). In addition to Narrative Standards, a tissue based selenium water quality standard exists for Gilbert Bay. No numeric mercury water quality standard

exists for Gilbert Bay, only Narrative Standards. In addition, no numeric water quality standards exist for the Transitional Waters, only Narrative Standards.

5.3.1 Outfall 001, RO Byproduct and Excess Deep Aquifer Feed Water

The Southwest Groundwater Treatment Plant concentrates the pollutants found in the intake (or feed) water by a factor of five. The byproduct flows through a 21 mile pipeline and is ultimately discharged to the Transitional Waters and Gilbert Bay. Limitations on total suspended solids (TSS) and pH are based on current Utah Secondary Treatment Standards, *UAC R317-1-3.2*. The Oil and Grease limitation is based on Best Professional Judgment (BPJ). BPJ is used on a case-by-case basis in the absence of effluent guidelines or water quality standards. In this case Oil and Grease is not anticipated to be present in the effluent due to the nature of the process, however it is precautionary to include an Oil and Grease limit in case there is an operational malfunction. The daily maximum concentration limit and annual load limit for selenium are based on BPJ to prevent egg concentrations in affected birds from exceeding 12.5 mg/kg because there are no water column standards for selenium for Gilbert Bay or the Transitional Waters. The 12.5 mg/kg selenium tissue-based standard for Gilbert Bay is based upon *R317-2-14* and is also being applied to the Transitional Waters to demonstrate compliance with the Narrative Standards.

The annual maximum load for mercury is 0.38 kg/yr and is 1% of the total mercury load for GSL from all sources of 38 kg/yr (Mercury Inputs to Great Salt Lake, Utah: Reconnaissance-Phase Results, *D. Naftz et al, 2009*). The technical rationale to support these limits is presented in the attached *Jordan Valley Water Conservancy District Southwest Groundwater Treatment Plant Outfall 001 FSSOB Supporting Information for Selenium and Mercury*.

The draft permit effluent limitations are:

Parameter	Effluent Limitations Outfall 001 a/b/c/d/e/				
	Max Monthly Average	Max Weekly Average	Daily Min	Daily Max	Annual Max
Total Flow, MGD f/g/	3.0				
Selenium, total, mg/L				0.054	
Selenium, kg/year					224
Selenium h/					
TSS, mg/L	25	35		70	
Mercury, kg/yr i/j/					0.38
Oil & Grease, mg/L				10	
pH, Standard Units			6.5	9.0	
WET, Chronic Biomonitoring, Both Species				Pass IC25 (EOP)	

a/ See definitions Part I.A. for definition of terms.

b/ All parameters in this table will be reported monthly in the monthly Discharge Monitoring Report.

c/ Metals samples should be analyzed using a method that meets MDL requirements. If a test method is not available the permittee must submit documentation to the Director regarding the method that will be used. The sample type (composite or grab) should be performed according to the methods requirements.

d/ There shall be no visible sheen or floating solids or visible foam in other than trace amounts.

e/ There shall be no discharge of sanitary wastes.

f/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.

g/ The flow rates and durations of all discharges shall be reported in the Annual Project Operating Report.

h/ Implementation of the selenium water quality standard of 12.5 mg/kg for Gilbert Bay of the GSL is outlined in Part I.D.8 of the UPDES Permit.

i/ Mercury samples must be analyzed using Method 1631 or other sufficiently sensitive method. The sample type (composite or grab) should be performed according to the method's requirements.

j/ This load constitutes 1% of the annual mercury load entering the GSL from all sources for this parameter and may change once the aquifer is fully characterized or other information on the effluent or receiving water becomes available.

5.3.2 Outfall 002, Shallow Aquifer Discharges to the Jordan River

During times of plant maintenance and to dispose of excess groundwater, the facility will need to discharge shallow well feed water (untreated groundwater) to the Jordan River. The limitations on TSS and pH are based on current Utah Secondary Treatment Standards, *UAC R317-1-3.2*. The Oil and Grease limitation is based upon BPJ (see 5.3.1 for explanation of BPJ). Due to uncertainties in plant operations, the DWQ will include a load limit for selenium based upon a continuous pressure relief bleed flow of 1.0 million gallons per day 270 days a year and a flow of 4.6 million gallons per day for 95 days a year. The flow of 4.6 million gallons per day is a combination of pressure relief bleed flow and feed water discharged as a result of maintenance activities. The selenium concentration used to calculate the load is based upon the anticipated effluent concentration of 0.0079 mg/L plus a 30% safety factor. The resulting concentration is 0.0103 mg/L. A wasteload calculated based upon an Acute Effluent Flow of 4.6 million gallons per day and a Chronic Effluent Flow of 1.0 million gallons per day resulted in allowable selenium concentrations of 0.089 mg/L and 0.027 mg/L respectively. Based on this, the use of 0.0103 mg/L in the load calculation is sufficiently protective. The selenium concentration effluent limit is based upon the most restrictive wasteload analysis. The limitation on TDS is based on Utah Water Quality Standards. The permit limitations are:

Parameter	Effluent Limitations Outfall 002 a/b/c/d/e/				
	Max Monthly Average	Max Weekly Average	Daily Min	Daily Max	Annual Max
TDS, mg/L				1,200	
Selenium, total, kg/yr					26.4
Selenium, mg/L				0.027	
TSS, mg/L	25	35		70	
Oil & Grease, mg/L				10	
pH, Standard Units			6.5	9.0	
WET, Acute Biomonitoring, both species				Pass LC_{50} (EOP)	

a/ See definitions Part I.A. for definition of terms.

b/ All of the parameters in the above table shall be reported monthly in the Discharge Monitoring Report.

c/ Metals samples should be analyzed using a method that meets MDL requirements. If a test method is not available the permittee must submit documentation to the Director regarding the method that will be used. The sample type (composite or grab) should be performed according to the methods requirements.

d/ There shall be no visible sheet or floating solids or visible foam in other than trace amounts.

e/ There shall be no discharge of sanitary wastes.

6.0 DEEP AQUIFER CHARACTERIZATION COMPLIANCE SCHEDULE

Further characterization of the deep aquifer is necessary for constituents that can't be adequately characterized until the plant is operational. Specifically, Jordan Valley needs to further characterize the low-level mercury concentrations in the deep aquifer. Preliminary samples, obtained before the wells were equipped with permanent pumps and the plant operational, were not analyzed using a low-level detection method. Further, obtaining the best representative sample of the deep aquifer is not entirely feasible until deep wells are in full production, thus giving a representative picture of the deep aquifer. A subsequent round of monitoring was conducted and analyzed using a low-level detection method for mercury but, due to a laboratory QA/QC error, the reported concentrations did not meet the data quality objectives. Additional sampling and analysis was done in first quarter of 2012. These results suggest that mercury concentrations will be up to 0.000015mg/L (15ng/L) in the effluent with an annual loading of 0.06 kg/yr. However, additional testing is needed to confirm the annual mercury loading results with a fuller representation of the aquifer. A compliance schedule will be included in the permit to allow the facility one year from the Southwest Groundwater Treatment Plant becoming

operational to further characterize the aquifer. In the interim, DWQ believes the 0.38 kg/yr mercury load limit from this discharge is insignificant relative to other mercury sources to the GSL and should be protective.

7.0 MONITORING AND REPORTING REQUIREMENTS

7.1 Self-monitoring and Reporting Requirements

The following self-monitoring requirements are based on the Utah Division of Water Quality's *Monitoring, Recording and Reporting Guidelines*. The permit will require reports to be submitted monthly and quarterly, as applicable, on Discharge Monitoring Report (DMR) forms due 28 days after the end of the monitoring period. Lab sheets for biomonitoring must be attached to the biomonitoring DMR.

Self-Monitoring and Reporting Requirements, Outfall 001 a/b/c/			
Parameter	Frequency	Sample Type	Units
Total Flow	Daily or Continuous	Measured	MGD
Total Mercury	Monthly	Composite or Grab	ng/L
Total Mercury d/	Monthly	Calculated	kg/yr
Total Selenium	2 x Weekly	Composite or Grab	mg/L
Total Selenium d/	Monthly	Calculated	kg/yr
TSS e/	2 x Weekly	Composite or Grab	mg/L
Selenium	Annually	Bird Eggs	mg/kg
Oil & Grease	Monthly if sheen is observed	Grab	mg/L
pH	Monthly	Grab	SU
WET, Chronic Biomonitoring	Quarterly, alternating species	Composite	Pass/fail

a/ See definitions Part I.A. for definition of terms.

b/ Jordan Valley shall also monitor all parameters and BOD_5, quarterly at the end of pipe for the first year of operation and then bi-annually thereafter. If lake levels rise where monitoring at end of pipe is not feasible, then Jordan Valley may petition the Director to establish an alternate sampling point.

c/ Mercury samples must be analyzed using Method 1631 or other sufficiently sensitive method. The sample type (composite or grab) should be performed according to the methods requirements.

d/ Cumulative totals for this parameter shall be reported on the monthly Discharge Monitoring Reports.

e/ Monitoring of this parameter is required at end of pipe during pipeline cleaning operations. Monitoring results must be included with the DMR for that monitoring period. If lake levels rise where monitoring at end of pipe is not feasible, then Jordan Valley may petition the Director to establish an alternate sampling point.

Self-Monitoring and Reporting Requirements, Outfall 002 a/b/c/			
Parameter	Frequency	Sample Type	Units
Total Flow	Daily or Continuous	Measured	MGD
TDS	2 x Weekly	Composite or Grab	mg/L
Total Selenium	2 x Weekly	Composite or Grab	mg/L
Total Selenium d/	Annually	Calculated	kg/yr
TSS	2 x Weekly	Composite or Grab	mg/L
Mercury	Monthly	Composite or Grab	ng/L
Oil & Grease	2 x Weekly, if sheen is observed	Grab	mg/L
pH	2 x Weekly	Grab	SU
WET, Acute Biomonitoring	Quarterly, both species	Composite	Pass/Fail

a/ See definitions Part I.A. of the draft permit for definition of terms.
b/ Mercury samples must be analyzed using Method 1631 or other sufficiently sensitive method. The sample type (composite or grab) should be performed according to the methods requirements.
c/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.
d/ Cumulative totals for this parameter shall be reported on the monthly Discharge Monitoring Reports.

7.2 Joint Discharge Area Transitional Waters Monitoring Program

One of the outcomes of the analyses presented in the *Jordan Valley Water Conservancy District Southwest Groundwater Treatment Plant Outfall 001 FSSOB Supporting Information for Selenium and Mercury* was the recommendation to implement a monitoring program to decrease uncertainty. A comprehensive sampling and analysis plan for egg, water, sediment and macroinvertibrates including field and laboratory standard operating procedures and methods was developed in 2011 and approved by the Director. This plan was made available for public review and comment as part of the Director's review process in March 2011. If lake levels rise significantly during this permit cycle, an alternate sampling plan, including methods and locations, must be submitted to the Director for approval prior to February 1 of that year.

Jordan Valley is required to annually sample eight (8) bird eggs, if available, but not to exceed 20% of available eggs, during the nesting season, April15 through June 30, for the current permit cycle. The eggs will be collected from bird nests in the joint Jordan Valley outfall 001 and Kennecott 012 affected outfall area. These samples will be subject to the tissue based selenium water quality standard of 12.5 mg/kg dry weight for Gilbert Bay of Great Salt Lake to demonstrate compliance with the Narrative Standard. Jordan Valley must notify the Director within 7 business days of becoming aware of any egg concentrations that exceed 9.8 mg/kg. In addition, total mercury concentrations in the egg tissue samples must also be evaluated and reported by Jordan Valley.

Jordan Valley is required to annually collect co-located macroinvertebrate, water, and sediment samples once between April 15 and June 30 and as close in time as practical to the bird egg collection. All samples will be analyzed for selenium. Biota and sediment will also be analyzed for total mercury. Water samples will be analyzed for methyl and total mercury. The co-located macroinvertebrates, sediment and water samples will be collected at up to six (6) evenly spaced locations along the discharge watercourse from the discharge point to the water's edge from where Outfall 001 enters standing waters of the Great Salt Lake.

Jordan Valley is required to biannually collect co-located brine shrimp and water samples twice per year from the open waters of Gilbert Bay in the vicinity of the outfall. Jordan Valley is required to submit an addendum to the Sampling Plan for approval by the Director within 90 days of issuance of this permit that includes the sampling methods and geographic coordinates to define the sampling area. Sample collection is constrained by brine shrimp dynamics in the sampling area as brine shrimp may not always be present when sampling is attempted. The Sampling Plan addendum will also include the minimum number of days that sampling will be attempted. The intent is to collect brine shrimp samples as close as available to where the effluent waters enter Gilbert Bay between April 15 and June 30 and in October. The water sample will be analyzed for total and methyl mercury and selenium. The brine shrimp sample will be analyzed for total mercury and selenium.

Jordan Valley will conduct annual bird surveys approximately every two weeks between April 15 and June 30 (four times per season) to document bird abundance, diversity, and use of the Outfall 001 mud flat habitat, particularly for evidence of feeding and nesting using methodology approved by the Director. This data will be submitted in the Annual Project Operating Report.

DWQ strongly recommends that Jordan Valley coordinate with other facilities that discharge in the same delta to avoid needless duplication and further impact to avian wildlife in the delta area. Other monitoring requirements may be shared if appropriate. The Director shall be notified as soon as possible, but no later than April 1, if the efforts to coordinate monitoring with other dischargers to the delta area are unsuccessful. The detailed field and laboratory data, analysis and a summary of the results from the bird surveys, egg samples and co-located water, sediment and macroinvertibrates' monitoring must be submitted to the DWQ by February 1, or another agreed upon date, following the end of the calendar year for which the results were obtained as a part of the Annual Project Operating Report.

8.0 STORM WATER

The Southwest Groundwater Treatment Plant has a Standard Industrial Classification (SIC) of 4941, Water Supply. Facilities under this classification are not required to obtain coverage under the UPDES Multi-Sector General Permit for Storm Water Discharges from Industrial Activity, Permit Number UTR000000. The permit contains a storm water re-opener provision if requirements are needed in the future.

9.0 PRETREATMENT REQUIREMENTS

Any process wastewater that the facility may discharge to the sanitary sewer, either as direct discharge or as a hauled waste, is subject to federal, state and local pretreatment regulations.

Pursuant to section 307 of the Clean Water Act, the permittee shall comply with all applicable Federal General Pretreatment Regulations promulgated, found in 40 CFR section 403, the State Pretreatment Requirements found in *UAC R317-8-8*, and any specific local discharge limitations developed by the Publicly Owned Treatment Works (POTW) accepting the waste. As this project will not discharge into a POTW there will be no Pretreatment requirements.

10.0 WHOLE EFFLUENT TOXICITY (BIOMONITORING) REQUIREMENTS

A nationwide effort to control toxic discharges where effluent toxicity is an existing or potential concern is regulated in accordance with the *State of Utah Permitting and Enforcement Guidance Document for Whole Effluent Toxicity Control (biomonitoring)*. Authority to require effluent biomonitoring is provided in *Permit Conditions, UAC R317-8-4.2, Permit Provisions, UAC R317-8-5.3* and *Water Quality Standards, UAC R317-2-5* and *R317 -2-7.2*.

Since the permittee will be a new major industrial discharging facility, with no previous discharge to evaluate, the permit will require acute whole effluent toxicity (WET) biomonitoring testing at the end of pipe (EOP) from Outfall 002, which will discharge to the Jordan River. Based upon these facts and being programmatically consistent utilizing the above referenced biomonitoring guidance document, the permittee will be required to quarterly conduct and pass the acute LC_{50} WET testing for both test species consisting of *ceriodaphnia dubia(water flea)* and *pimephales promales(fathead minnow)* as appropriate. Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration during the WET testing. Therefore, the permittee is required to "Pass" the Lethal Concentration criteria (LC_{50}) for each WET monitoring period, as detailed in the permit. Chronic WET toxicity tests have not been included in this permit for this outfall because the estimated low flow receiving stream conditions, with discharges from Outfall 002, are projected to be generally greater than a 20:1 dilution ratio. This rationale is consistent with similar permits and with the WET Guidance Document referenced above.

Jordan Valley will also be required to conduct and pass quarterly chronic IC_{25} WET testing from Outfall 001, which will discharge to the Transitional Waters and Gilbert Bay. Jordan Valley will utilize and alternate between two approved test species, *Americamysis bahia* (mysid shrimp) and *Cyprinodon variegatus* (sheepshead minnow). Chronic toxicity occurs when the survival, growth, or reproduction for either test species exposed to a specific percent effluent dilution is significantly less (at the 95 percent confidence level) than the survival, growth, or reproduction of the control specimens. IC_{25} is defined as the concentration of a toxicant (given in percent effluent) that would cause a 25% reduction in mean young per female, or a 25% reduction in overall growth for the test population.

The permit also contains standard requirements for accelerated testing upon failure of a WET test, and a Preliminary Toxicity Investigation (PTI) and Toxicity Reduction Evaluation (TRE) as necessary. The permit will also contain the Toxicity Limitation Re-opener provision that allows for modification of the permit at any time to include additional WET testing requirements and/or test methods should additional information indicate the presence of toxicity in future discharges.

11.0 ANTIDEGRADATION LEVEL II REVIEW

Antidegradation Reviews are intended to ensure that waters that have better quality than required

by the standards are not degraded unless the degradation is necessary for important social or economic reasons.

Jordan Valley has completed Antidegradation Level II Reviews for the discharge of the byproduct water to the Transitional Waters and Gilbert Bay of Great Salt Lake and for the feed water from the shallow wells to the Jordan River. These documents are part of the UPDES Permit Application and are available for review.

The Level II Review for the byproduct discharge noted that discharge of the byproduct water to GSL is not the least degrading alternative nor is it the lowest cost alternative. However, given the net environmental and social benefits, it was determined that this alternative was the best option.

The DWQ concurs with the findings of the Level I (compliance with water quality standards) and Level II Reviews.

12.0 PERMIT DURATION

It is recommended that this permit be effective for a duration of five (5) years.

Drafted by
Kim Shelley, Discharge
Mike George, Storm Water
Jeff Studenka and Mike Herkimer, Whole Effluent Toxicity
Chris Bittner, ADR and Outfall 001 FSSOB Supporting Information for Selenium and Mercury
Utah Division of Water Quality

13.0 PUBLIC NOTICE

Began: May 13, 2013
Ended: June 28, 2013
Public Noticed in the Salt Lake Tribune and Desert News.

Comments were received during the public comment period. A comment response summary was sent to all commenters on March 4, 2014. The final permit is not the same as the public noticed draft. It has been modified as per the comment response document.

Initial Public Notice Period
Began: December 1, 2010
Ended: February 1, 2011
Public Noticed in the Salt Lake Tribune and Desert News.

Comments were received during the public comment period. A comment response summary was sent to all commenters on May 18, 2012.

APPENDIX 1

Jordan Valley Water Conservancy District Southwest Groundwater Treatment Plant Outfall 001 FSSOB Supporting Information for Selenium and Mercury

1.0 Introduction Selenium and mercury are different than other pollutants in the Jordan Valley Southwest Groundwater Treatment Plant byproduct (effluent) because aquatic-dependent birds, as opposed to aquatic organisms, are the most sensitive receptors of the uses defined in R317-2-6 (Division of Water Quality(DWQ), 2008; Schwarzbach and Adelsbach, 2003; NJ, 2002; USEPA, 1995, 1997). Selenium has a numeric tissue-based water quality criterion of 12.5 mg/kg in bird eggs (R317-2-14, Table 2.14.2) for Gilbert Bay but no numeric criterion is available for the Transitional Waters. No numeric standards for mercury apply to Gilbert Bay or Transitional Waters. DWQ used a weight-of-evidence approach to determine that the under the conditions of the permit, the selenium and mercury in the byproduct will comply with the Narrative Standard and the uses will be protected. Although WET testing is a requirement of this permit, WET testing may not effectively evaluate pollutants that are a greater potential threat to the upper trophic level (aquatic dependent birds) because of biomagnification (mercury) or when the upper trophic levels are toxicologically more sensitive (selenium).

The Antidegradation Review, completed in 2010, identified selenium as a parameter of concern because byproduct concentrations will be greater than ambient in the receiving waters. The antidegradation review also identified mercury as a parameter of concern because of its biomagnification potential and incomplete information regarding mercury concentrations in the byproduct. Subsequent sampling and analyses by Jordan Valley are summarized in Table 1 and provide more refined estimates of potential mercury concentrations in the byproduct than were available for the previous permit draft.

In the previous draft of the permit public noticed from December 2010-January 2011, selenium effluent limits were based on a mixing model and mercury effluent limits were based on non-detect values[1]. The estimated mercury loads from the Southwest Groundwater Treatment Plant's byproduct were compared to existing loads of mercury to Gilbert Bay. DWQ reevaluated the available data, applicable rules, and permitting guidance and concludes that the approach recommended in USEPA (2010) *Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion* (*Methylmercury Guidance*) is more appropriate for evaluating the discharges of selenium and mercury than the previous approach. The *Methylmercury Guidance* states "EPA believes, depending on the particular facts, that a permit writer may reasonably conclude that limits on point sources consistent with this guidance are likely to be as stringent as necessary to achieve water quality standards."

1 Mercury concentrations were too low to be measured using the analytical method commonly used. Jordan Valley collected additional water samples for mercury analysis using more rigorous methods.

Table 1. Mercury Concentrations in Southwest Groundwater Treatment Plant Feed Water and Byproduct and Flow Rates

Well	Feedwater Flow Rate (gpm)	Byproduct Flow Rate (gpm)	Groundwater Mercury Concentration (ng/l)	Projected Mercury Concentration (ng/l)
DW1	675	135	1.61	8.1
DW2	210	42	11.37	56.8
DW3	175	35	4.07	20.4
DW4	ND	ND	4.20	21.0
DW5	ND	ND	3.62	18.1
DW6	777	155	2.99	15.0
DW7	1500	300	1.97	9.8
DW8	ND	ND	1.48	7.4
Shallow	6792	1358	3.17	15.8

gpm = gallons per minute
ng/l = nanograms per liter
ND = no data

The *Methylmercury Guidance* was developed to assist USEPA and States in implementing the methylmercury criterion because the standard[2] is based on mercury concentrations in fish tissue. This was the first tissue-based numeric standard ever promulgated by USEPA. USEPA anticipated challenges in implementing a tissue-based numeric standard and committed to developing implementation guidance when the standard was adopted in 2001. USEPA took 9 years from adoption of the tissue-based standard to develop and finalize the *Methylmercury Guidance*. Utah's tissue-based numeric selenium standard for Gilbert Bay was promulgated in 2008 and approved by USEPA in 2011.

DWQ reviewed the *Methylmercury Guidance* and determined that the approach could be adapted to the selenium standard. DWQ has also adapted the approach in the *Methylmercury Guidance* to selenium in the Transitional Waters (R317-2-6.5.E.) and mercury in Gilbert Bay and in the Transitional Waters. The major differences from the approach in the previous draft permit are that the *Methylmercury Guidance* approach does not rely on mixing zone analyses and provides specific recommendations to address existing data gaps that may be encountered when implementing a tissue-based standard.

Figure 1 shows the process adapted for selenium from the *Methylmercury Guidance*. Selenium was substituted for mercury and egg tissue is substituted for fish tissue when compared to Figure 5 in the *Methylmercury Guidance*. To apply the process to mercury, mercury is substituted for selenium in Figure 1.

Mercury impacts have been studied by scientists in a wider range of environments than selenium. Like selenium, the chemical form of mercury affects its toxicity with elemental generally being the least toxic and organic forms such as methyl mercury being the most toxic. It is anticipated that Jordan Valley will not discharge methylmercury but rather an inorganic salt. The water in Gilbert Bay has methyl mercury in addition to other forms of mercury. A portion of the mercury discharged into Gilbert Bay is expected to be converted to the more toxic methylmercury by bacteria in the lake. While the focus of the analyses of

2 Antidegradation, Uses, Numeric Criteria, and Narrative Criteria comprise Standards of Quality for Waters of the State (R317-2). However, numeric criteria are commonly referred to as standards and this common usage is adopted here.

mercury will be on methylmercury, the reader should remember that Jordan Valley's discharge is not expected to contain methylmercury. This assumption will be verified by the monitoring required by this permit.

The available studies on mercury demonstrate the complexity and site-specificity of mercury dynamics. USEPA's *Mercury Study to Congress* (1997), the USEPA Great Lakes Initiative, and USEPA *Methylmercury Guidance* represent extensive efforts by USEPA to understand and effectively regulate mercury. USEPA is aware that for many water bodies, including Great Salt Lake, air deposition is the major source of mercury and further regulation of point source discharges would have no apparent effect in improving water quality (FR March 23, 1995 p. 15365). The remainder of this analysis follows the process in Figure 1 and is organized by pollutant and receiving water:

1. Selenium discharge to Gilbert Bay
2. Selenium discharge to the Transitional Waters
3. Mercury discharge to Gilbert Bay
4. Mercury discharge to the Transitional Waters

2.0 Selenium .

2.1 Selenium discharge to Gilbert Bay

2.1.1 Selenium water translator for Gilbert Bay.

Following the process in Figure 1, the standard (see footnote 1 regarding criterion and standard) for selenium is expressed in terms of a tissue concentration. Gilbert Bay has a tissue-based standard of 12.5 mg/kg[3] selenium in bird eggs. The next question asks if a water column translator for selenium is available. A water translator would provide the selenium water concentration that would result in 12.5 mg/kg selenium in aquatic dependent bird eggs. A water column translator is a mathematical formula that relates selenium concentrations in the water to selenium concentrations in bird egg tissue. If the water column translator is available, water quality based effluent limits can be calculated (if necessary) using the established methods for UDPES permits, *i.e.*, a waste load analysis. Site-specific translators typically determined using empirical data are the most reliable (USEPA, 2010; Adams et al., 1998). The implicit assumption of using a translator is that changes in water column concentrations of selenium will predictably result in changes in egg tissue concentrations (Section 6, DWQ, 2008). Based on the following analyses, DWQ concluded that a translator is not available.

Water translators are simplified models of complex processes. A conceptual site model for the cycling of selenium was created for Great Salt Lake that identifies the key abiotic and biotic compartments for the transfer of selenium through the food web (Sections 6 & 7, DWQ 2008). Samples of co-located water, food, and egg data were analyzed to characterize the selenium relationship between each compartment with the ultimate goal of identifying a single translator. A single translator would integrate the transfer of selenium through several already simplified compartments from water to eggs, e.g., water → algae → brine shrimp/brine flies → birds → eggs. If the overall translator performs poorly, i.e., the translator doesn't accurately or reliably predict egg concentrations from water concentrations, examining translators between each compartment may identify the food web link with the highest variability and focus research efforts.

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3 All concentrations in solid media (for instance, brine shrimp, sediment, and eggs) are reported as dry weight unless otherwise noted.

Initial efforts to determine a water translator for selenium in Gilbert Bay are documented in Brix et al. (2004). This study was the basis of the existing water-quality-based effluent limit for Kennecott Utah Copper's (Kennecott) UDPES permit. Selenium, primarily as selenate, displayed a curvilinear relationship between water and brine shrimp exposed in a laboratory or field setting. Assuming a linear relationship and that a maximum allowable concentration of 5 mg/kg selenium in brine shrimp would protect birds feeding on the shrimp, an acceptable water concentration of 27 µg/l was determined. Kennecott's existing maximum daily effluent selenium concentration of 54 µg/l was based on a twofold dilution in the mixing zone of the 27 µg/l.

A key limitation of Brix et al. (2004) is that the only transfer of selenium from water to brine shrimp was measured in the laboratory. Uptake rates measured this way may underestimate uptake for Gilbert Bay if the inorganic selenium in Kennecott's discharge is converted to organic forms of selenium in for instance, algae in Gilbert Bay. The selenium translator assumed by Brix et al. (2004) for brine shrimp to birds was estimated from laboratory and field studies for other aquatic systems that are quite different from Great Salt Lake. As discussed later in this section, more recent studies of selenium at Gilbert Bay support a higher acceptable concentration of selenium in brine shrimp than the 5 mg/kg assumed by Brix et al. (2004).

Brine shrimp uptake of selenium under laboratory conditions was studied as part of *Development of a Selenium Standard for the Open Waters of Great Salt Lake* (DWQ, 2008). Figure 2 shows brine shrimp uptake at concentrations in water up to about 80 µg/l. However, the marked decrease in brine shrimp tissue concentrations observed at the higher concentrations is difficult to explain. These brine shrimp were only exposed for 24 hours, the uptake was from water only (no dietary exposure), and the results are inconsistent with similar studies, so this data is considered unreliable for determining a translator.

Byron et al. (2011) compiled data from three different saline environments including Gilbert Bay to derive a selenium translator from water to brine shrimp. Figure 3 from Byron et al. (2011) shows that Gilbert Bay selenium concentrations were generally less than 1 µg/l[4] and concentrations in corresponding brine shrimp don't respond predictably. Byron et al. (2011) concludes that selenium concentrations must be higher before concentrations in brine shrimp respond predictably. Using the translator proposed by Byron et al. (2011) and assuming 27 µg/l selenium in water results in a predicted brine shrimp concentration of 11 mg/kg whereas Brix et al. (2004) predicts 5 mg/kg.

As shown on Figure 4, Gilbert Bay selenium concentrations in water and brine shrimp do not appear highly correlated. Geometric mean selenium concentrations in Gilbert Bay waters from the different sampling events ranged from 0.26 to 1. The lack of correlation to brine shrimp selenium concentration could be simply due to lack of large fluctuations in selenium concentrations in the water. Ultimately, the importance of determining which brine shrimp translator is most appropriate is diminished because of the uncertainties regarding an acceptable selenium concentration in bird diet (brine shrimp). Selenium dynamics in Gilbert Bay were studied for approximately 18 months as part of the DWQ Selenium Study.

The primary limitation of this effort in deriving a water translator for selenium is that egg concentrations in Gilbert Bay were (and remain) less than 12.5 mg/kg. The highest geometric mean for eggs from Gilbert Bay shorebirds was less than 6 mg/kg which limits the ability to model higher concentrations such as 12.5 mg/kg (Figure 5). Extrapolating beyond the models predictive interval to 12.5 mg/kg selenium in eggs predicts a concentration in bird diet of 6 mg/kg. Additional work on the

model since the DWQ Selenium Study suggests that the current best estimate is 7.8 mg/kg selenium in bird diet if extrapolated beyond the prediction interval to 12.5 mg/kg in eggs. Extrapolating the relationship between diet and eggs from lower concentrations to higher concentrations is undesirable because egg concentrations of selenium may be overestimated (Brix et al., 2004; DeForest *et al.*, 2007; Grosell 2008 in DWQ, 2008).

Translators for bird diet to bird egg from the literature were considered but data from Gilbert Bay suggest that selenium transfer from food to eggs is lower than in these systems. Cavitt and Stone, (2007) collected 4 female shorebirds and their eggs from Gilbert Bay. The blood, livers, and eggs were analyzed for selenium. The ratio of selenium between Great Salt Lake bird blood to eggs and bird liver to eggs was compared to laboratory studies of Santolo et al. (1999) and Heinz et al. (1989). Santolo et al. (1999) fed kestrels organic selenium and measured the transfer to blood and eggs. Santolo's translator applied to Cavitt's Gilbert Bay bird blood predicts much higher selenium concentrations in eggs than observed (Table 2). Similarly, Heinz et al. (1989) fed organic selenium to mallards and measured the selenium concentration in the liver and eggs. Heinz's translator applied to Cavitt's Gilbert Bay liver predicts much higher selenium concentrations in eggs than was observed (Table 2). Cavitt's eggs data suggests that the selenium translator between birds and eggs is lower in Gilbert Bay than observed in studies of other systems.

DWQ continues to actively investigate and monitor selenium in Gilbert Bay. As shown on Figure 6, Cavitt and Wilson (2012) collected additional samples of eggs, invertebrates, water, and sediment in 2011 but the egg concentrations were less than 2 mg/kg. Samples collected from Antelope Island (Gilbert Bay) and Farmington Bay (Class 5D) in 2011 measured selenium in dietary items (insects) at higher concentrations than in eggs, which is opposite of the relationship observed in other samples shown on Figure 5 and in studies of other aquatic systems (Presser et al. 2010) . These 2011 results should be interpreted cautiously pending confirmation with the results of future sampling.

Table 2 Selenium Concentrations in Gilbert Bay Bird Blood, Liver, and Eggs Compared to Egg Concentrations Predicted from Blood and Liver

Bird Blood (mg/kg dw)	Predicted Egg Concentration (mg/kg dw)	Bird Liver (mg/kg dw)	Predicted Egg Concentration (mg/kg dw)	Clutch Average Egg (mg/kg dw)
23	52.4	14	15.5	2.6
12	27.4	11	12.0	1.8
13	29.7	11	12.0	2.1
21	47.8	17	19.1	2.3
Concentrations in blood, liver, and eggs from Cavitt and Stone (2007). Egg concentration predicted from blood concentration using Santolo et al. (1999). Egg concentration predicted from liver concentration using Heinz et al. (1989) and assuming 71% moisture for egg tissue and 68% moisture for liver tissue.				

In the context of the process in Figure 1, DWQ concludes that reliable selenium translators from water to bird eggs, water to diet (brine shrimp or brine flies), and diet to eggs are unavailable for the Gilbert Bay.

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4 Byron et al. 2011 identifies Gilbert Bay samples as being greater than 100 µg/l but these are not Gilbert Bay samples. These are samples collected by Brix et al. (2004) from the West C7 Ditch which historically had higher concentrations of selenium not representative of current conditions.

2.1.2 Selenium Reasonable Potential for Gilbert Bay Following the process described in Figure 1, the next question is if the byproduct has quantifiable selenium which is yes. The following question is if the bird eggs from Gilbert Bay exceed the criterion or are there other factors that would lead DWQ to find reasonable potential.

For the discharge to Gilbert Bay, the available data supports that selenium from the Southwest Groundwater Treatment Plant discharge will not adversely affect birds in Gilbert Bay based on a comparison to historic loadings from KUC's discharge. Selenium egg concentrations from Gilbert Bay are less than the selenium standard of 12.5 mg/kg, so the standard has not been exceeded since more frequent sampling began in 2006.

All of the available studies support a lack of observed adverse effects to birds at Gilbert Bay from selenium or other pollutants. The strength of the no adverse effects conclusion is limited because these studies were not designed or intended to comprehensively evaluate either the health of Gilbert Bay's birds or the immediate area of Jordan Valley's proposed discharge.

1. Cavitt, J. F. and N. Wilson, 2012. *Concentrations of Selenium and Mercury in American Avocet Eggs at Great Salt Lake, Utah 2011 Report* . Avian Ecology Laboratory, Weber State University

2. Cavitt, J.F., M. Linford, and N. Wilson. *Selenium Concentration in Shorebird Eggs at Great Salt Lake Utah 2010 Report*, Avian Ecology Laboratory, Weber State University

3. DWQ, 2008. *Development of a Selenium Standard for the Open Waters of Great Salt Lake.* Prepared by CH2M Hill. May.

4. U.S. Fish and Wildlife Service (USFWS). 2009. *Assessment of Contaminants in the Wetlands and Open Waters of the Great Salt Lake, Utah 1996-2000*

5. Vest, J.L., M.R. Conover, C. Perschon, J. Luft, and J.O. Hall. 2009. Trace Element Concentrations in Wintering Waterfowl from Great Salt Lake. *Arch. Environ. Contam. Toxicol.* 56:302-316

6. Conover, M.R. and J.L. Vest. 2008. Selenium and Mercury Concentrations in California Gulls Breeding on the Great Salt Lake, Utah, USA. *Environ. Tox. Chem.*

While there's no evidence the selenium standard is exceeded in Gilbert Bay at existing loading, the additional selenium loading from the Southwest Groundwater Treatment Plant's byproduct must also be considered because the Southwest Groundwater Treatment Plant's selenium loading will be in addition to Kennecott's.

Figure 7 shows Kennecott's selenium loading since 2002 and Figure 8 shows Gilbert Bay selenium water concentrations are consistently between 0.3 and 1 µg/l over the same period. Figure 4 shows the geometric mean concentrations of selenium measured in brine shrimp from Gilbert Bay. As previously noted, Byron et al. (2011) concluded that brine shrimp do not respond predictably to changing selenium water concentrations less than 1 µg/l. The lack of measurable response of Gilbert Bay water concentrations to varying loads from Kennecott's discharge demonstrates that despite Gilbert Bay being part of a terminal lake, selenium loading is not conservative and Gilbert Bay has assimilative capacity[5] beyond simple dilution. The absence of a measurable response in water concentrations to varying loads

5 Assimilative capacity is the amount of selenium that can be added and the water still meet the standards.

also suggests that selenium assimilative capacity remains. Selenium is lost from Gilbert Bay by several ways but the predominant mechanism is volatilization (Johnson *et al.*, 2007).

DWQ concludes no reasonable potential at a selenium loading limit of 900 kg/yr based on a documented lack of adverse impacts to birds at these loads previously discharged by Kennecott. USFWS (2009) provides some evidence that historical selenium loads of greater than 900 kg/yr have not adversely affected birds. This permit limits the Southwest Groundwater Treatment Plant's selenium loading to 224 kg/yr and therefore, DWQ concludes that this load, in addition to loading from Kennecott Outfall 012, is a combined annual selenium load greater than 900 kg/yr, and results in an "unknown reasonable potential" in the context of the process in Figure 1.

Consistent with the process in Figure 1, this permit requires Jordan Valley to submit a monitoring plan to the Director for approval to evaluate selenium uptake into lake biota for the Gilbert Bay waters. Data quality objectives include characterizing selenium concentrations in Gilbert Bay co-located brine shrimp and water collected as proximate as practical to where the byproduct enters Gilbert Bay from the Transitional Waters. The permit also requires Jordan Valley to submit these results annually to be approved by DWQ. Jordan Valley is not required to prepare a Selenium Minimization Plan because the source of selenium is the feed water (untreated groundwater). The *Methylmercury Guidance* states that the minimization plans focus on sources and wastes that originate with and are under the reasonable control of a facility, not on pollutants in rainwater or source water.

The primary goal of the additional monitoring in the Gilbert Bay is to monitor for increasing trends in selenium concentrations. The selenium standard is currently met in Gilbert Bay, so monitoring for an increasing trend can provide an early warning prior to concentrations becoming high enough to impair the uses. If concentrations continue to increase, the effluent limits for all permits to Gilbert Bay can be reevaluated. In conjunction with DWQ's monitoring, the monitoring required by this permit will also improve the understanding of spatial and temporal dynamics of selenium concentrations. This data will also be used by DWQ in ongoing efforts to evaluate the feasibility of a selenium water translator. DWQ has initiated a twice per year monitoring program for Gilbert Bay and samples of water and brine shrimp were collected and analyzed for inorganic pollutants including selenium (DWQ, 2012). Selenium concentrations in brine shrimp and water from 1995 through 2011 are summarized on Figure 4.

Monitoring brine shrimp is anticipated to provide more stable estimates of selenium dynamics in Gilbert Bay than water despite the lack of stability documented in Figure 4. The lack of stability in brine shrimp concentrations is likely due to low selenium concentrations in water (< 1 µg/l Byron et al. 2011). Stability is anticipated to improve if concentrations in water increase because concentrations in brine shrimp represent selenium concentrations averaged over a longer time which is expected to show less variation than grab samples of water. In addition, brine shrimp are one food-web step closer to an egg which is also anticipated to decrease the variability. Gilbert Bay is not impaired for selenium and a lack of detectable increase in selenium concentrations provides evidence that the assimilative capacity remains and the uses will remain protected. However, the converse is not necessarily true. Bird eggs are less than 12.5 mg/kg indicating additional assimilative capacity remains. Monitoring brine shrimp concentrations for increasing trends in conjunction with the selenium egg triggers in R317-2 Table 13.4.2 Footnote 14, provide adequate assurance that Gilbert Bay's beneficial uses will continue to be met. The monitoring will also inform whether water or brine shrimp are better predictors of selenium in bird eggs.

Additional studies by DWQ, U.S. Fish and Wildlife Service, Utah Division of Wildlife Resources, U.S. Geological Survey, and others continue to evaluate avian health in Great Salt Lake. DWQ continues to

monitor the outcome of these studies in managing the water quality of Gilbert Bay. Jordan Valley's permit can be modified using the reopener provision as recommended by the process illustrated in Figure 1.

2.2. Selenium discharge to Transitional Waters

2.2.1 Selenium water translator for Transitional Waters. The Transitional Waters do not have a numeric standard for selenium. The channel created by the discharge will be effluent dominated when either Kennecott or the Southwest Groundwater Treatment Plant are discharging[6]. The Southwest Groundwater Treatment Plant is expected to have a continuous discharge, eventually up to 3 million gallons per day. DWQ has determined that shorebirds are the most sensitive receptors for the same reasons that shorebirds are the most sensitive receptors for Gilbert Bay (DWQ, 2008) DWQ determined that the 12.5 mg/kg selenium standard for Gilbert Bay is applicable to confirm that the requirements of the Narrative Standard are met and existing uses are protected in the Transitional Waters.

Like Gilbert Bay, no reliable water translator is available for the Transitional Waters. Applying the relationship observed in Figure 5 to the Transitional Waters at Jordan Valley's discharge may not be appropriate. The sample locations represented in Figure 5 are from primarily shoreline environments where the source of selenium is likely Gilbert Bay as opposed to Southwest Groundwater Treatment Plant byproduct. Uptake of selenium from water to birds is dependent on the chemical form of selenium with organic selenium having the highest uptake rates. Even within organic types of selenium, uptake rates are dependent on the particular organic form of selenium (Heinz et al. 1999). Therefore, no data specific for the Southwest Groundwater Treatment Plant's byproduct are available. Transfer of selenium from the water to biota is anticipated to be lower in the Transitional Waters than for Gilbert Bay waters because of flow and a limited amount of time for conversion to the more bioavailable organic forms of selenium (Presser and Luoma, 2010).

In accordance with the process shown in Figure 1, this permit includes a monitoring requirement for the Transitional Waters located in the effluent channel between the outfall and Gilbert Bay. The Southwest Groundwater Treatment Plant was not discharging, but in spring 2011, Jordan Valley voluntarily conducted this monitoring. A results report, 2011 *Delta Monitoring Report August 2012*, was submitted to DWQ. Selenium was measured in water, sediment, and invertebrates but no eggs were available for collection. Other than the results of the 2011 sampling in the discharge delta (CH2M Hill, 2012) when the Southwest Groundwater Treatment Plant was not discharging, little specific data is available to define the transfer of selenium from the Southwest Groundwater Treatment Plant to the food web. For these reasons, DWQ concludes that a selenium water column translator is unavailable for the Transitional Waters.

2.2.2 Selenium reasonable potential for the Transitional Waters. As previously discussed, the primary source of water in the channel created by the discharge in the 5E waters will be effluent. Assuming little assimilative capacity for the Transitional Waters, concentration, as opposed to loading, is the most applicable parameter for selenium. The Southwest Groundwater Treatment Plant proposed selenium discharge limit of 54 µg/l is the same as Kennecott's UDPES permit. Eggs were collected from the Transitional Waters in the vicinity of Kennecott's effluent channel in 2007 and were all below 12.5 mg/kg selenium (Figure 5). However, the discharge concentrations were below the maximum permitted

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6 A low flow of water can be observed in the discharge channel when Kennecott is not discharging. This water is thought to be daylighting groundwater and presumably would provide some dilution. For the purposes of this analysis, dilution is assumed to be negligible and is not considered.

concentration of 54 µg/l: May 2007 30-day average 23 µg/l; maximum daily maximum 26 µg/l vs. permitted daily maximum 54 µg/l (Figure 9). Permit maximum concentrations consider effluent variation when they are set and it's common for actual concentrations to be lower than permitted.

As part of the 2011 sampling (CH2M Hill, 2012), a brine shrimp sample was collected at the interface of Gilbert Bay and the Transitional Waters. Based on the relatively low salinity of Kennecott's effluent and previous observations of no brine shrimp, the shrimp were likely transients pushed ashore by a wind seiche (CH2M Hill, 2012). The selenium concentration reported for this single brine shrimp sample is higher at 30.8 mg/kg than previous samples collected from Gilbert Bay even though water concentrations were not correspondingly elevated (5.4 µg/l). The second highest selenium concentrations in brine shrimp were measured by Brix et al. (2004). Brix et al. (2004) measured a maximum selenium concentration in brine shrimp of less than 10 mg/kg in two samples collected from the nearby West C7 Ditch where the water concentrations were approximately 120 µg/l.

The single 2011 shrimp sample also had an anomalously high moisture content (98.6%) when compared to previous brine shrimp samples collected from Gilbert Bay. When the selenium concentration for this sample is calculated as wet weight, the concentrations are similar to previous samples suggesting that the dry weight concentration is exaggerated because of an error with the moisture measurements (CH2M Hill, 2012).

DWQ reviewed the *2011 Field and Laboratory Data Great Salt Lake Outfall 001* (CH2M Hill, 2012) results during the preparation of this permit. The data has limited applicability for developing translators because of the lack of co-located eggs.

The 2007 egg sampling (DWQ, 2008) from the Transitional Waters in the area of the Kennecott's outfall 012 provides limited support that a maximum discharge concentration effluent limit of 54 µg/l will protect the use (aquatic dependent birds). However, these results are based on a limited number of samples and their representativeness to the Southwest Groundwater Treatment Plant byproduct is unknown. Therefore, DWQ concludes that the existing data is inconclusive for determining reasonable potential for the Transitional Waters. In accordance with the process described in Figure 1, this permit requires Jordan Valley to monitor water, sediment, invertebrates, and eggs in the Transitional Waters for selenium. This monitoring is summarized in the *Joint Discharge Area Transitional Waters Monitoring Program.*

In addition, the permit contains two triggers based on concentrations of selenium measured in bird eggs. If geometric mean concentrations exceed 12.5 mg/kg dry weight because of the Southwest Groundwater Treatment Plant, reductions of selenium will be required. If geometric mean concentrations of selenium increase from current conditions to 9.8 mkg/kg or or greater because of the Southwest Groundwater Treatment Plant effluent, Jordan Valley must implement a plan to reduce bird exposures to selenium from the effluent. Two triggers in the previous draft of this permit were deleted. The first trigger at 5.0 mg/kg selenium in eggs required a reevaluation of the sufficiency of the monitoring plan. This trigger was unnecessary because the *Joint Discharge Area Transitional Waters Monitoring Program* was developed assuming selenium concentrations in eggs will be at or above 5 mg/kg. The second deleted trigger at 6.4 mg/kg selenium concentrations in eggs required that the antidegradation review be reviewed. This trigger was deleted because a recent Level II antidegradation review of the Southwest Groundwater Treatment Plant was completed as part of this permit application.

As for the open waters, a Selenium Minimization Plan is not required.

2.3 Selenium Summary. In summary, DWQ finds that the data is insufficient to determine reasonable potential for selenium for Gilbert Bay and the Transitional Waters. As a result of these determinations, DWQ has added permit conditions requiring monitoring of Gilbert Bay brine shrimp and co-located water proximate to where the discharge enters from the Transitional Waters. Consistent with the previous draft of the permit, the condition to require monitoring of water, sediment, invertebrates, birds, and bird eggs for selenium in the Transitional Waters remains. The permit also has a reopener clause to reassess reasonable potential (if necessary) based on the results of this monitoring.

3.0 Mercury

3.1 Mercury discharge to Gilbert Bay. Less data is available for mercury than for selenium in Gilbert Bay. The 2008 and 2010 Integrated Reports assessed Gilbert Bay (and the other bays and Transitional Waters at Great Salt Lake) as Category 3C[7]. Category 3C is a unique assessment Category used for Great Salt Lake. Assessment of the Great Salt Lake ecosystem with traditional approaches is complicated by the current lack of numeric standards, with the exception of a selenium standard applicable to bird eggs. Also, the lake is naturally hypersaline, so traditional assessment methods are not appropriate. DWQ is working toward developing both numeric standards and assessment methods for this ecosystem. In the interim, the Integrated Report will include an Appendix that summarizes progress that was made in the most recent 2-year reporting cycle.

3.1.1Mercury water translator for Gilbert Bay. Efforts by DWQ to assess if water quality is supporting Gilbert Bay's s uses with regards to mercury have focused on methylmercury. The 2008 and 2010 Utah Integrated Report documents these efforts. Methylmercury, an organic form of mercury, is present in Gilbert Bay's water and biota[8] at measurable concentrations. As discussed in the Introduction, the Southwest Groundwater Treatment Plant is not expected to discharge methylmercury but a portion of the mercury discharged to the lake is anticipated to be methylated by bacteria. Because of the increased toxicity and biotransfer potential of methylmercury compared to other forms of mercury found in the environment, methylmercury has the greater potential for impairing the uses. No numeric standards are available for methylmercury for Gilbert Bay.

As discussed in the Appendix A of the *2010 Integrated Report*, methylmercury biomagnifies in the food web resulting in increasing exposures at higher trophic levels. Therefore, birds as members of the upper trophic food web are the focus of protecting Gilbert Bay and the Transitional Waters beneficial uses. Based on the review of the literature documented in the 2010 Integrated Report, a tissue-based standard is likely to protect aquatic dependent birds (the most sensitive use) from impairment by methylmercury. Therefore, DWQ is adapting the same tissue-based permitting approach from the *Methylmercury Guidance* used for selenium to mercury (Figure 1).

The data for all pollutants in the Southwest Groundwater Treatment Plant byproduct are estimates because the plant is not yet operating. For instance, several of the Southwest Groundwater Treatment Plant groundwater wells are not yet functioning (see Table 1). The mercury estimates have additional uncertainties because mercury concentrations are low enough to require special sample handling and analysis procedures. For the previous draft of the permit, mercury concentrations were estimated from

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7 Other Integrated Report Categories include for instance, that the water quality is Fully Supporting, Impaired by a Pollutant and a TMDL is required, or Impaired and the TMDL is complete. See Figure 6 in Utah's 2010 Integrated Report Part 1: Methods of Assessing and Reporting the Condition of Lakes and Streams.

8 Measurements of mercury in biota for Great Salt Lake are for total mercury that is assumed to be mainly methylmercury.

non-detect analytical results. This is the same as the approach used for the majority of other Great Salt Lake UPDES permits. For most of these permits, mercury concentrations are not precisely known because the results from the more common analytical method with higher detection limits are non-detects. The previous draft of this permit required Jordan Valley to use a more rigorous analytical method for mercury because of specific concerns identified in the Integrated Report regarding mercury.

Jordan Valley voluntarily conducted additional sampling and analyses that provide more refined estimates of mercury concentrations in the byproduct. Jordan Valley estimates that the byproduct will contain up to 0.000015 mg/l (15 ng/l) of mercury with annual loads of up to 0.06 kg/yr (Table 1). This annual load is less than 0.38 kg/yr estimated for the previous draft of the permit. However, DWQ is not proposing to revise the permit effluent limits from the previous draft at this time because of remaining uncertainties regarding the concentrations of mercury under normal operating conditions. Jordan Valley is required by this permit to complete the characterization of mercury in the byproduct when operations commence and DWQ will evaluate revising the load limits when this data becomes available.

As documented in the 2008 and 2010 Integrated Reports, existing data is insufficient to determine if mercury or methylmercury are impairing the uses of Gilbert Bay or the Transitional Waters. USFWS (2009) did detect (assumed) methylmercury concentrations in some samples of biota above screening levels collected from Gilbert Bay. In deriving a mercury water quality standard for protection of wildlife in the Great Lakes, USEPA estimated water to bird translators (biomagnification and bioaccumulation) exceeding 1 million (the concentration in water needs to be over 1 million times lower than acceptable concentration in bird diet). The data needed to determine translators for Great Salt Lake using a model similar to the one used for the Great Lakes requires data that is currently unavailable for Great Salt Lake.

More recent data still being reviewed by DWQ includes water and brine shrimp collected from the Gilbert Bay by Naftz et al., in 2009 and samples analyzed by DWQ collected in July and October of 2011 (Figure 9). The DWQ results should be treated with caution pending completion of the data validation. For instance, in some samples, the concentration of methylmercury exceeds total mercury which is a physical impossibility. Clean sampling and laboratory techniques are required to avoid quality control problems like methylmercury being higher than total mercury when concentrations are so low.

In addition to the lack of a Gilbert Bay specific maximum acceptable concentration of methylmercury in bird eggs, data representing the actual methylmercury concentrations in bird eggs is also lacking. This general lack of egg data specific to Gilbert Bay is in part because the Gilbert Bay does not support suitable nesting species for monitoring (DWQ, 2008).

In the context of the process in Figure 1, DWQ concludes that the data are inadequate to derive water to food, or food to bird translators for Gilbert Bay.

3.1.2 Mercury reasonable potential for Gilbert Bay. No numeric standards are available for the mercury in Gilbert Bay. The USEPA tissue-based standard for methylmercury is based on the concentration of mercury in fish and the human consumption. This standard should not be applied to Gilbert Bay because of the lack of fish and human consumption. Other standards such as Utah's freshwater mercury standard and USEPA's chronic mercury standard for saltwater were also evaluated for applicability to the Gilbert Bay. Mercury concentrations in the Southwest Groundwater Treatment Plant's byproduct (15 ng/l) are anticipated to be similar to Utah's freshwater chronic mercury standard (12 ng/l) but Utah's freshwater standard is based on accumulation in fish consumed by people like USEPA's tissue-based standard. USEPA's recommended chronic standard for mercury in salt water is 980 ng/l but is based on direct effects to aquatic organisms and does not consider biotransfer through the

food web. For the Great Lakes, USEPA recommends a mercury standard of 1.3 ng/l for the protection of wildlife (includes bird) which is below naturally occurring mercury concentrations in the groundwater that will be treated by Jordan Valley.

USGS analyzed mercury concentrations in brine shrimp collected from Gilbert Bay in each month, June through December 2008. Monthly geometric mean concentrations of mercury were less than 70 µg/kg (unpublished data). DWQ observed similar results when brine shrimp were sampled from Gilbert Bay in 2011 (Figure 10). As discussed in the 2010 Integrated Report, an acceptable concentration for mercury in brine shrimp is uncertain. However, Evers et al. (2004) proposes that mercury concentrations less than 500 µg/kg in fish would be low risk to fish-eating birds. Brine shrimp are less than 500 µg/kg mercury. Although several technical issues have to be addressed before adopting Evers et al. (2004) as reliable for Great Salt Lake, the Evers values are judged more likely to overestimate mercury toxicity in Gilbert Bay than underestimate. This preliminary conclusion is based on the prevalence of known mercury antagonists such as selenium, sulfur, chloride, and zinc which would reduce to the toxicity of mercury.

Overall, the site-specific data is inadequate to determine reasonable potential in accordance with the process in Figure 1. The lack of observable adverse effects in birds in the Great Salt Lake studies cited in Section 2.1.2 suggest that current mercury concentrations are not adversely affecting birds and impairing the uses but the data is too limited to be definitive. Concentrations of mercury measured in brine shrimp are also below Evers et al. (2004) screening level for low risk. While the existing data do support that uses are being supported in Gilbert Bay, the data to quantify the available assimilative capacity is inadequate. DWQ judges that the relatively small contribution of mercury to Gilbert Bay from the Southwest Groundwater Treatment Plant (0.06-0.38 kg/yr) in comparison to other existing sources (38 kg/yr Naftz et al. 2009) to be unlikely to exceed the assimilative capacity. In the context of the process described in Figure 1, DWQ determined that reasonable potential is unknown for mercury in Gilbert Bay. Therefore, this permit requires Jordan Valley to monitor water, and invertebrates in Gilbert Bay for mercury to collect the data necessary to determine reasonable potential.

3.2 Mercury discharge to the Transitional Waters

3.2.1 Mercury water translator for the Transitional Waters. Even less is known regarding mercury in the Transitional Waters than in Gilbert Bay. This is in part due to the low concentrations of mercury present and the technical challenges of reliably measuring mercury at these concentrations. The conversion of mercury to methylmercury is dependent on site-specific conditions and difficult to predict. Jordan Valley did measure mercury in samples collected from the outfall delta in 2011 (CH2M Hill, 2012) and 2012 when Kennecott was intermittently discharging, not the Southwest Groundwater Treatment Plant. The 2011 and 2012 data collected by Jordan Valley will be useful for comparisons after the Southwest Groundwater Treatment Plant commences discharging, i.e., the 2011 sample results are representative of baseline conditions with only KUC discharging. In the context of the process in Figure 1, DWQ concludes that the data are inadequate to derive water to food, or food to bird translators for the 5E waters.

3.2.2 Mercury reasonable potential for the Transitional Waters. Like Gilbert Bay, the maximum concentration of mercury in the Transitional Waters that would be protective of the uses is uncertain. Mercury concentrations in invertebrates (bird dietary items) from the 2011 *Field and Laboratory Data Great Salt Lake Outfall 001* (CH2MHill, 2012) ranged from 123 to 356 µg/kg and were less than the Evers et al. (2004) low risk mercury screening value of 500 µg/kg. Similar to Gilbert Bay, the applicability of applying Ever's screening values that were based on fish to invertebrates in the Transitional Waters in

uncertain. As previously discussed, the 2011 sampling conducted for the *Joint Discharge Area Transitional Waters Monitoring Program* is without the Southwest Groundwater Treatment Plant discharging. DWQ judges that the available data is inadequate to determine reasonable potential for mercury in the Transitional Waters.

DWQ continues to fill data gaps to support determining a Great Salt Lake-specific acceptable maximum mercury concentration as documented in the Integrated Reports. To address these data gaps specifically for the Southwest Groundwater Treatment Plant discharge in accordance with the process in Figure 1, this permit requires monitoring of mercury in water, sediment, invertebrates, and bird eggs in the affected transition waters to evaluate the feasibility of developing translators and completing a reasonable potential analysis. Given the low concentrations expected, these translators may ultimately be infeasible to determine but aren't critical if the uses remain supported.

3.3 Mercury Summary

Gilbert Bay and Transitional Waters are not currently impaired for mercury. However, the available data is inadequate to conclude that these waters are fully supporting their uses. Great Salt Lake is in Category 3C, Insufficient Data for the Integrated Report. DWQ is actively working to resolve these deficiencies and specific monitoring requirements were added to this permit to address these data gaps as recommended by the USEPA's Methylmercury Implementation Guidance. DWQ's preliminary conclusion is that the Southwest Groundwater Treatment Plant's byproduct is an inconsequential source of mercury to Gilbert Bay compared to other sources of loading. For the Transitional Waters, the low concentrations of mercury in the byproduct are unlikely to adversely affect the uses that will be confirmed by monitoring.

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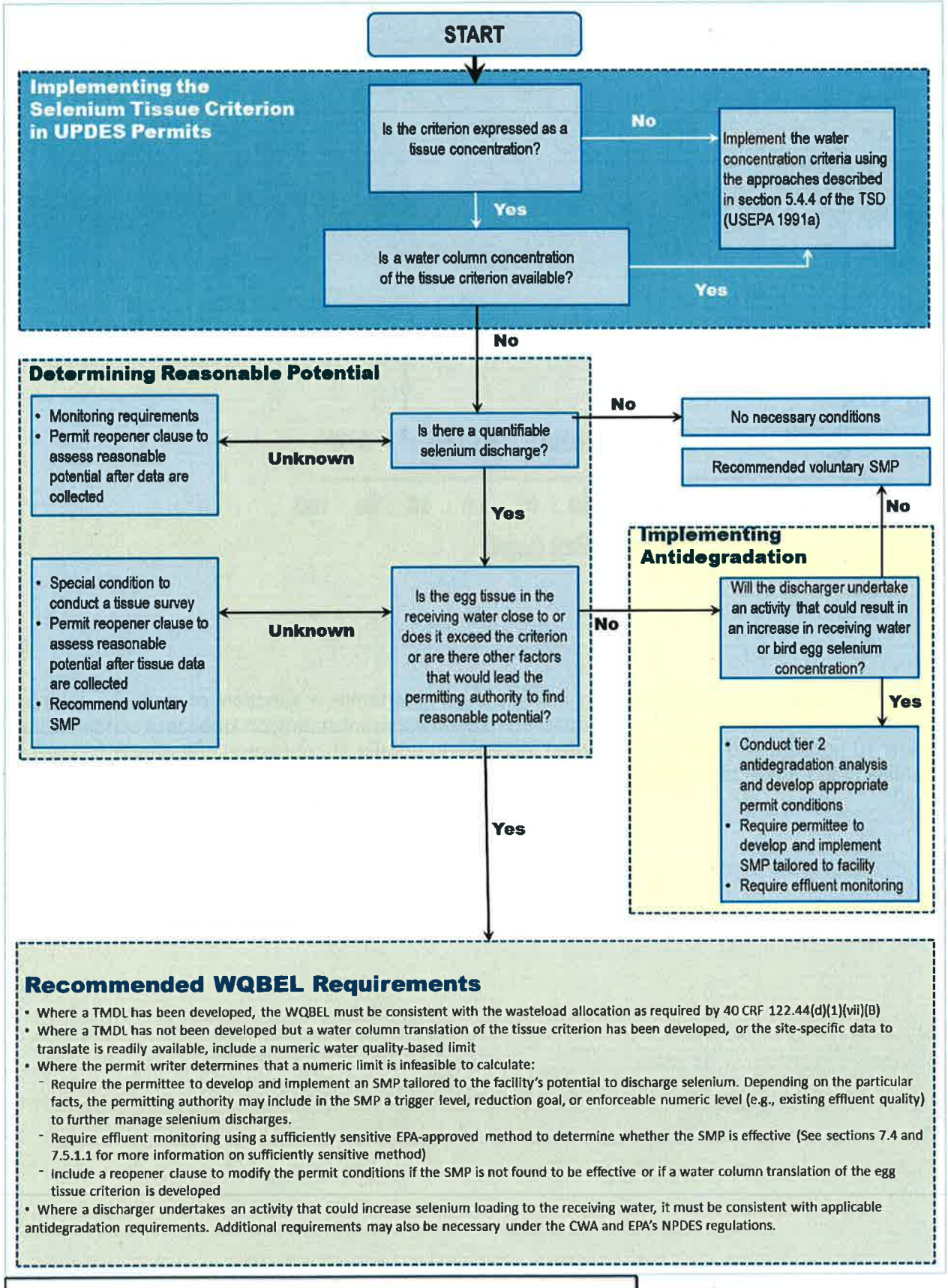


Figure 1. SWGTP permitting approach for selenium egg criterion modified from the USEPA (2010) Methylmercury Implementation Guidance. SMP=Selenium Minimization Plan

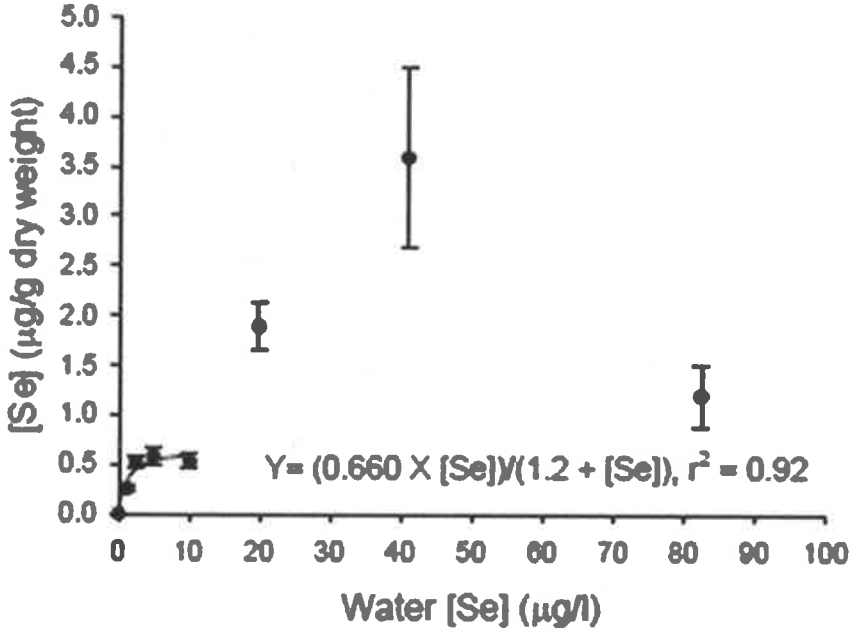


Figure 2. Selenium accumulation in individual adult artemia a function of ambient selenium concentrations following a 24-hour exposure. Note the apparent saturation kinetics at concentrations below 10 µg Se/L and the clear elevated increase in uptake at concentrations above 10 µg Se/L identifying the "knee"to be between 10 and 20µg Se/L.

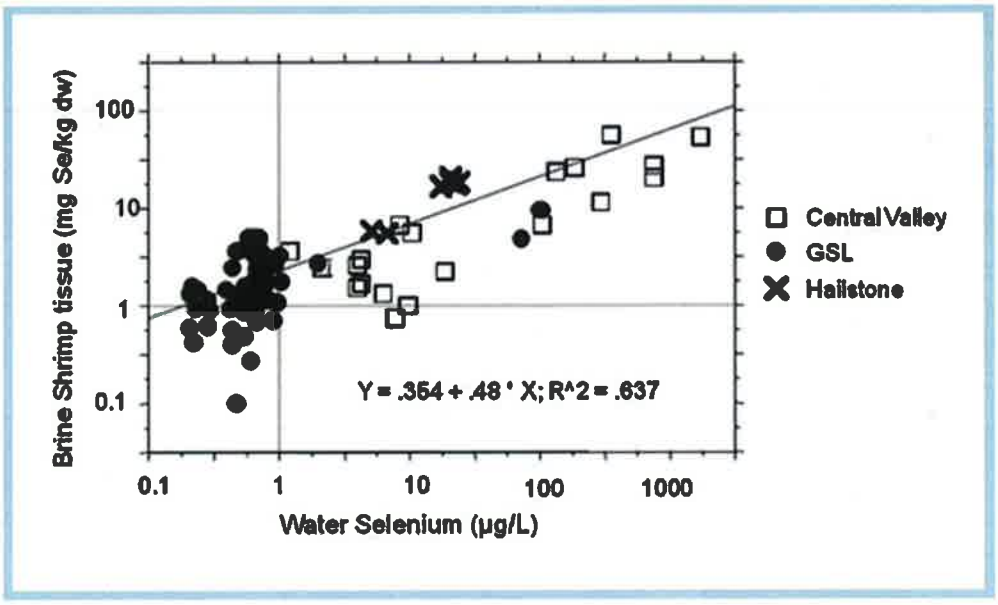
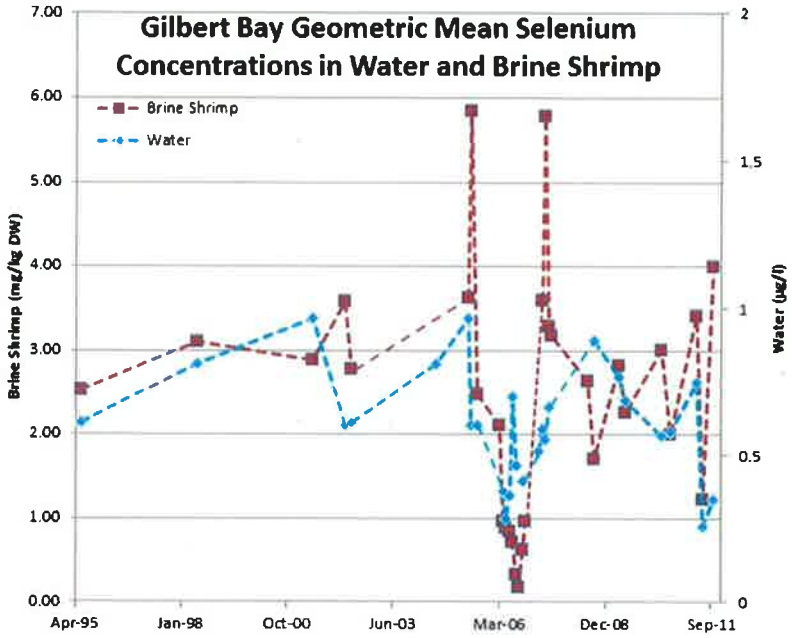


Figure 3. Brine shrimp tissue Se as predicted from total Se in cocollected water samples of the test dataset. The 3 data sources are Central Valley, California, ponds; Great Salt Lake, Utah (GSL); and Hailstone Reservoir, Montana (Byron et al. 2011)



Data Table for Geometric Mean Concentrations of Selenium in Brine Shrimp and Water from Gilbert Bay, Great Salt Lake									
Date	Brine Shrimp (mg/kg DW)	n	Water (ug/l)	n	Date	Brine Shrimp (mg/kg DW)	n	Water (ug/l)	n
Jun-95	2.54	43	0.61	7	Nov-06	0.62	12		
Jun-98	3.11	1	0.81	14	Apr-07			0.51	2
Jun-01	2.89	7	0.96	7	May-07	3.60	49	0.59	6
Apr-02	3.58	2	0.60	9	Jun-07	5.79	11	0.55	4
Jun-02	2.78	5	0.60	8	Jul-07	3.29	19	0.66	4
Aug-04			0.38	4	Aug-07	3.17	21		
Jun-05	3.63	7	0.29	4	Jul-08	2.64	7		
Jul-05	5.85	8	0.37	4	Sep-08	1.71	6	0.89	6
Sep-05	2.48	8	0.70	2	May-09	2.83	7	0.77	7
Apr-06	2.11	7			Jul-09	2.27	7	0.69	7
May-06	0.96	23	0.46	5	Jun-10	3.01	6	0.57	6
Jun-06	0.90	9	0.41	8	Sep-10	2.00	5	0.58	5
Jul-06	0.84	12	0.51	2	May-11	3.42	8	0.75	8
Aug-06	0.72	12	0.59	6	Jul-11	1.23	8	0.26	8
Sep-06	0.33	10	0.55	4	Oct-11	3.99	7	0.35	8
Oct-06	0.18	11	0.66	4					

Figure 4 Geometric Mean Concentration of Selenium in Brine Shrimp and Water from Gilbert Bay from USFWS, Kennecott, USGS, and DWQ data

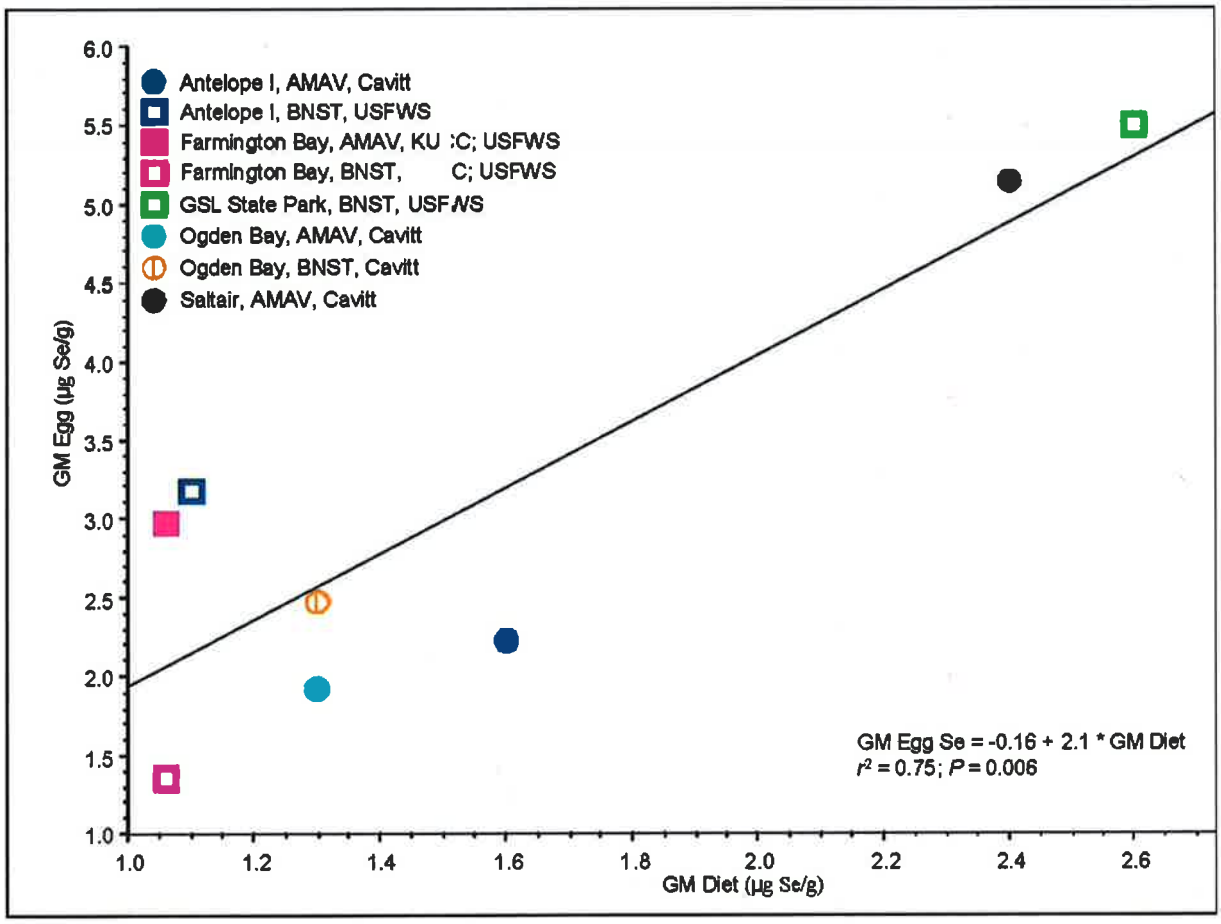
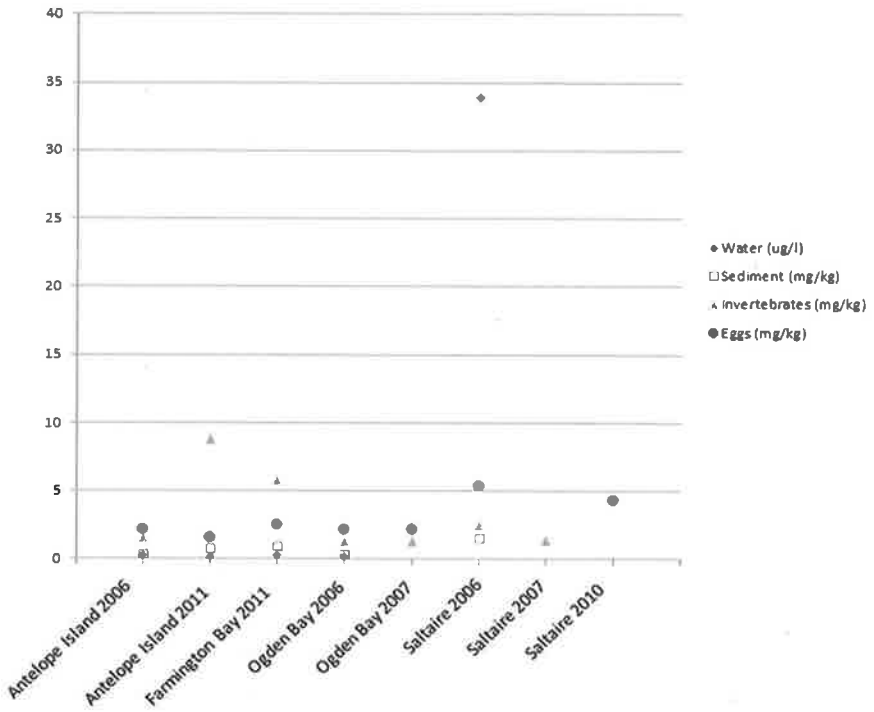


Figure 5. Relationship between shorebird geometric mean diet and egg selenium concentrations at various locations. (Figure 6- 4 DWQ, 2008)



Sample Location	Water Samples	Sediment Samples	Invertebrate Samples	Egg Samples
Antelope Island 2006	3	3	9	21
Antelope Island 2011	2	1*	1	5
Farmington Bay 2011	2	1*	1	5
Ogden Bay 2006	3	3	9	40
Ogden Bay 2007	0	0	2	13
Saltaire 2006	3	3	6	8
Saltaire 2007	0	0	1	0
Saltaire 2010	0	0	0	11
*Composite of 5 aliquots				

Figure 6 Geometric mean selenium concentrations in water, sediment, invertebrates, and eggs

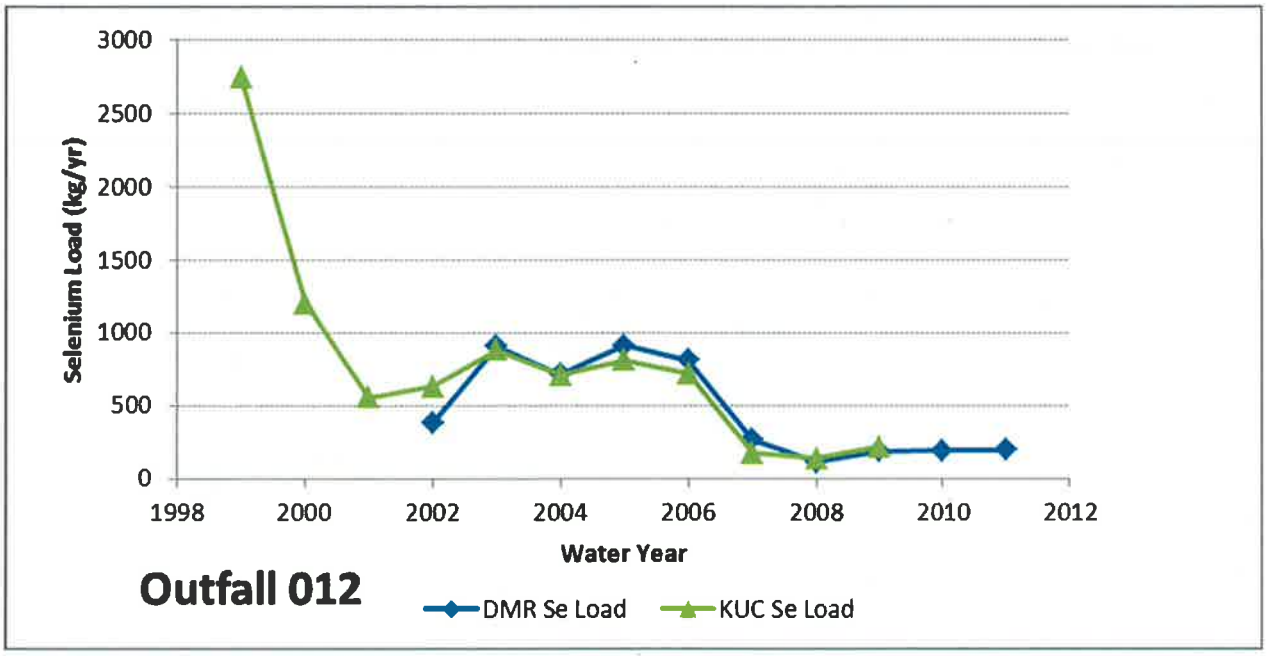


Figure 7. Selenium loads calculated from the DWQ Discharge Monitoring Reporting (DMR) Database and as estimated by Kennecott Utah Copper

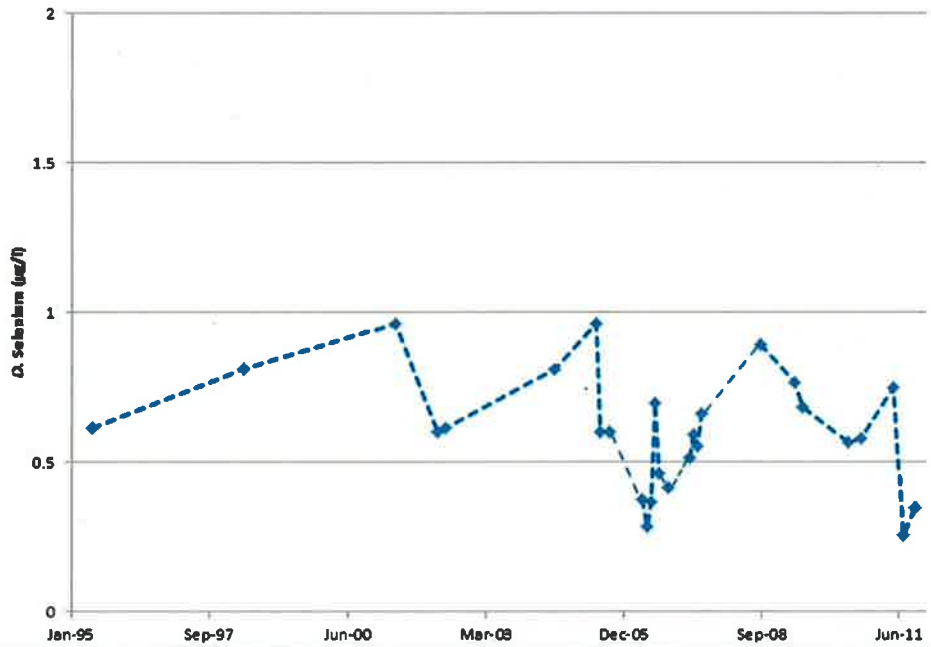


Figure 8. Selenium geometric mean concentrations for Gilbert Bay from USGS, Kennecott, and DWQ data

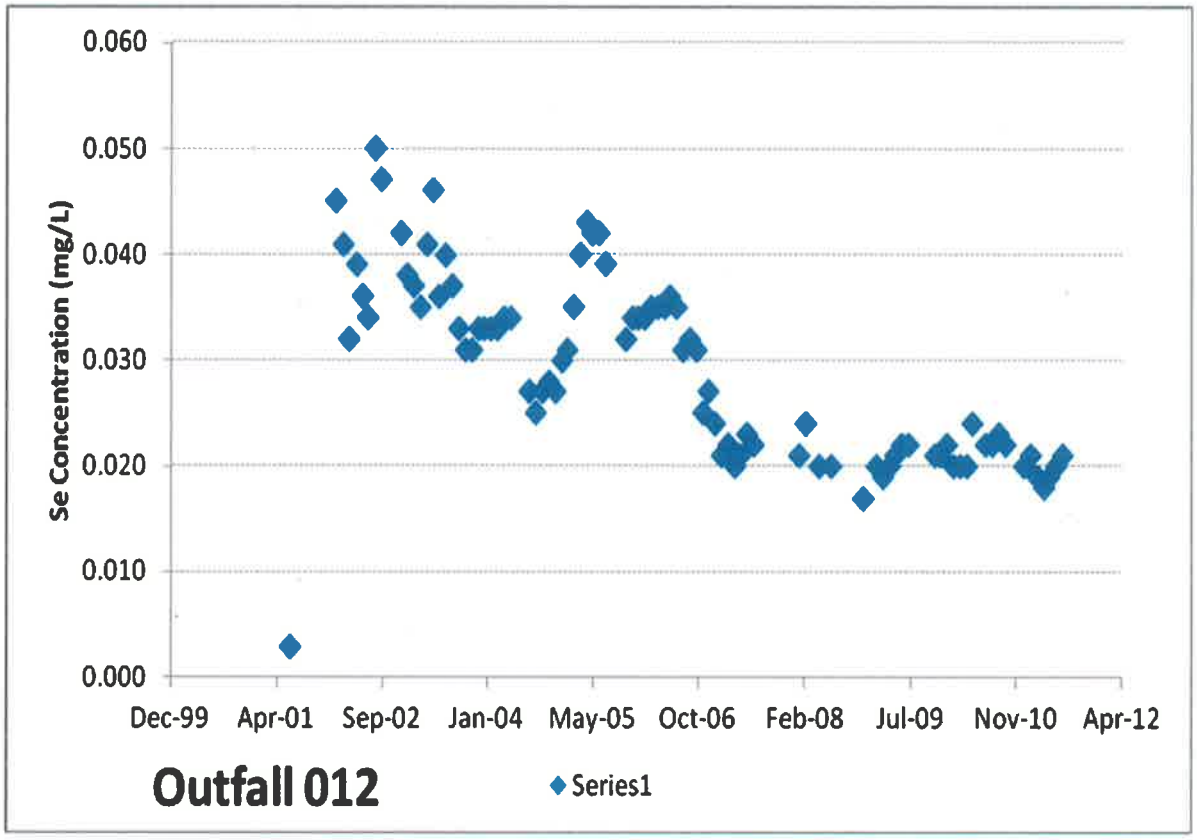


Figure 9. Monthly average selenium concentrations in Kennecott Utah Copper Outfall 012 from Discharge Monitoring Reports

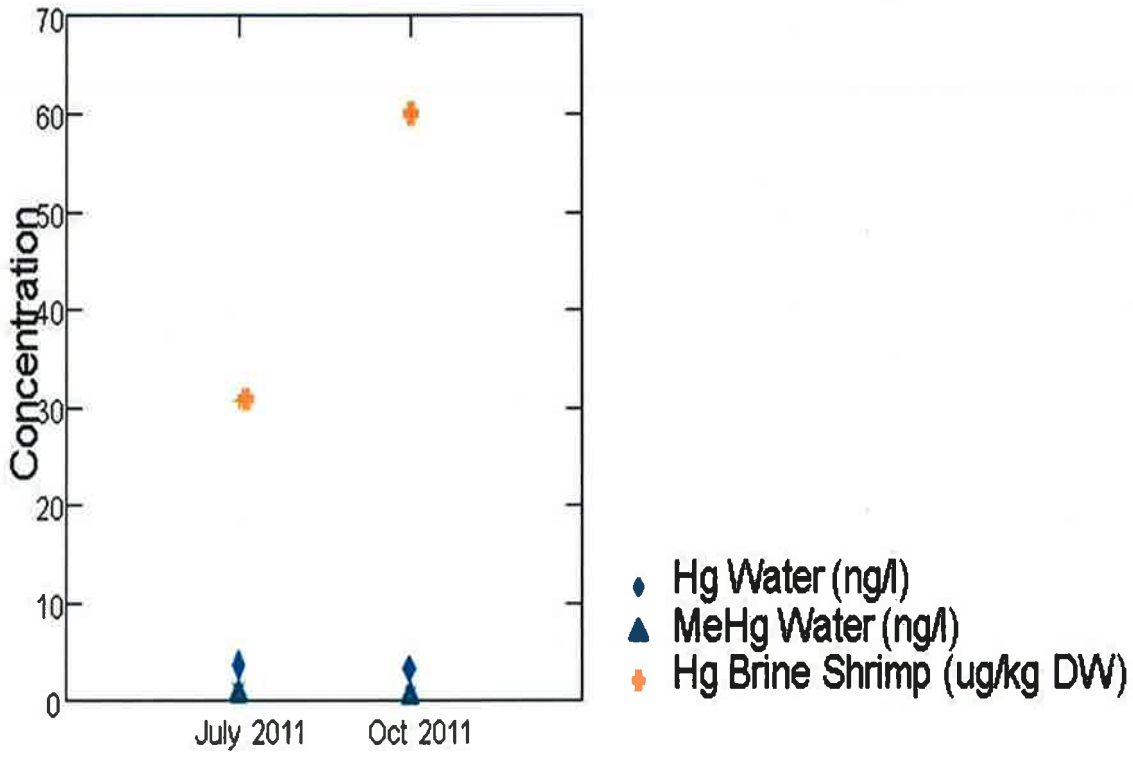


Figure 10 Geometric Mean Concentration of Total Mercury and Methyl Mercury in Gilbert Bay Water and Total Mercury in Brine Shrimp (8 locations). Water geometric mean excludes deep brine layer samples. Samples were collected from 8 locations (DWQ, 2012)

APPENDIX 2

Wasteload Allocations for Outfall 002 to the Jordan River

ALLOWABLE EFFLUENT CONCENTRATION/LOADING
FOR CONSERVATIVE SUBSTANCES

Date of Analysis: 3/27/2013

This Calculates the Allowable Effluent Concentration/Loading for Pressure relief discharges from 002
Conservative Substances in a Receiving Water
Assumption: Complete Mixing

Conservative Substance:	Selenium
Acute or Chronic Standard	Chronic
Discharger:	JVWCD
Receiving Water:	Jordan River
Classification:	2B, 3A, 4
For the Season / Year	All Seasons

Receiving Water Information - Jordan River

Flow, cfs	70.000
Flow, cfs (Acute)	35.000
Selenium, mg/l	0.00330
Selenium Load, lbs/day	1.25

Stream Standard

Selenium, mg/l	0.0046
Allowable Loading Before Mix:	1.74 lbs/day
Acute / Chronic Standard [Toxics]	Chronic

Effluent Information [Proposed] JVWCD

Flow, gal./min.	
Flow, MGD	4.60000
Flow, cfs	7.116
Selenium, mg/l	0.00790
Selenium Load, lbs/day	0.30
Selenium Load, lbs/year	110.60
Selenium Load, tons/day	0.0002
TDS Load, tons/year	0.1
Percent of Receiving Stream = Di	0.09
Dilution Ratio: (to 1.0)	9.84
Percent of Stream Flow Used in C	100%

Combined Effluent/Receiving Water Information

Flow, cfs	77.116	cfs
Selenium, mg/l	0.00372	mg/l
Concentration Delta Increase, mg/l	0.00042	mg/l [Delta]
Percent Increase:	0.13	%
Selenium Load, lbs/day:	1.55	lbs/day
Allowable Loading After Mix:	1.91	lbs/day
Additional Loading Allowed:	0.36	lbs/day

Current Permit Information

Flow, MGD (per WLA)	0.0
Effluent Limitation (per WLA)	0.00000
Current Project Loading	0.0000

Permitted Effluent Concentration:	**0.017**	**mg/l**
Permitted Effluent Loading:	**0.66693**	**lbs/day**

17.4 ug/l for : All Seasons
0.1 tons/year

Effluent Concentration Safety Factor:	0.0095	mg/l
Effluent Loading Safety Factor:	0.3639	lbs/day

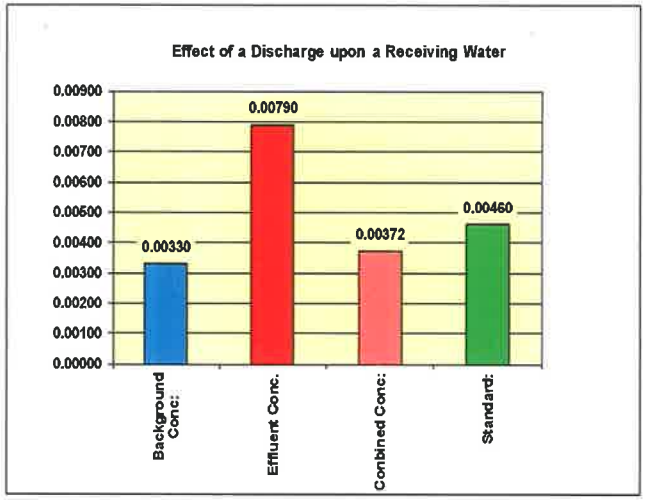
Note: Whole Effluent Toxicity (WET) to be conducted on all toxic substances,.
Note: Waste Load Analysis may indicate unreasonably high allowed concentrations and loadings. Narrative standards, New Source Performance Standards, and BAT also apply.

Background Conc:	0.00330
Effluent Conc.	0.00790
Conbined Conc:	0.00372
Standard:	0.00460
Percent Change	12.9%

Assumptions:
1. Critical low flow is from previous wasteload prepaired by Dr. Moellmer.
2. Selenium concentration of receiving water is based on a 7 year average of data collected at 7800 South, Storet Number 4994170.

Level I Antidegradation Review

Existing Project Loading	None	lbs/day
Proposed Project Loading	0.3030	lbs/day
% Increase in Project Loading	0.0%	
Current Stream Pollutant Load	1.2451	lbs/day
Proposed Stream Pollutant Lo	1.5481	lbs/day
% Increase in Stream Loading	24.3%	
Current Stream Pollutant Conc	0.0033	mg/l
Proposed Stream Pollutant Co	0.0037	mg/l
% Increase in Stream Conc.	12.9%	



ALLOWABLE EFFLUENT CONCENTRATION/LOADING FOR CONSERVATIVE SUBSTANCES

Date of Analysis: 3/27/2013

This Calculates the Allowable Effluent Concentration/Loading for Conservative Substances in a Receiving Water
Assumption: Complete Mixing

Pressure relief discharges from 002

Conservative Substance:	Selenium
Acute or Chronic Standard	Chronic
Discharger:	JVWCD
Receiving Water:	Jordan River
Classification:	2B, 3A, 4
For the Season / Year	All Seasons

Receiving Water Information - Jordan River	
Flow, cfs	70.000
Flow, cfs (Acute)	35.000
Selenium, mg/l	0.00330
Selenium Load, lbs/day	1.25
Stream Standard	
Selenium, mg/l	0.0046
Allowable Loading Before Mix:	1.74 lbs/day
Acute / Chronic Standard [Toxics]	Chronic

Effluent Information [Proposed] JVWCD	
Flow, gal./min.	
Flow, MGD	1.00000
Flow, cfs	1.547
Selenium, mg/l	0.00790
Selenium Load, lbs/day	0.07
Selenium Load, lbs/year	24.04
Selenium Load, tons/day	0.0000
TDS Load, tons/year	0.0
Percent of Receiving Stream = Di	0.02
Dilution Ratio: (to 1.0)	45.25
Percent of Stream Flow Used in C	100%

Combined Effluent/Receiving Water Information		
Flow, cfs	71.547	cfs
Selenium, mg/l	0.00340	mg/l
Concentration Delta Increase, mg/l	0.00010	mg/l [Delta]
Percent Increase:	0.03	%
Selenium Load, lbs/day:	1.31	lbs/day
Allowable Loading After Mix:	1.77	lbs/day
Additional Loading Allowed:	0.46	lbs/day

Current Permit Information	
Flow, MGD (per WLA)	0.0
Effluent Limitation (per WLA)	0.00000
Current Project Loading	0.0000

Permitted Effluent Concentration:	**0.063**	**mg/l**
Permitted Effluent Loading:	**0.52885**	**lbs/day**

63.4 ug/l for : All Seasons
0.1 tons/year

Effluent Concentration Safety Factor:	0.0555	mg/l
Effluent Loading Safety Factor:	0.4630	lbs/day

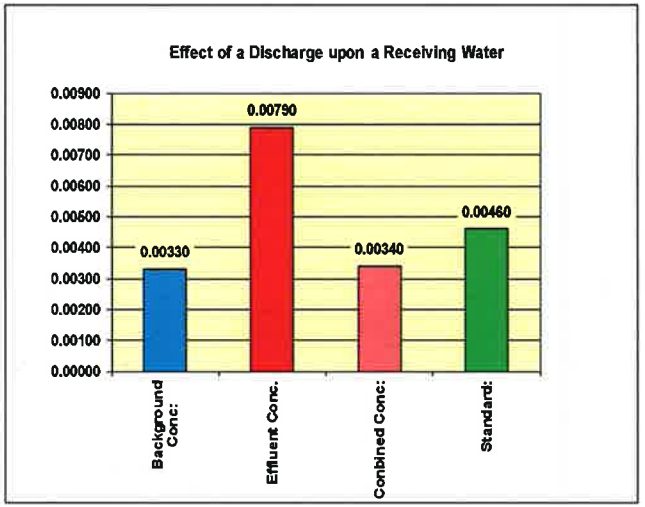
Note: Whole Effluent Toxicity (WET) to be conducted on all toxic substances,.
Note: Waste Load Analysis may indicate unreasonably high allowed concentrations and loadings. Narrative standards, New Source Performance Standards, and BAT also apply.

Background Conc:	0.00330
Effluent Conc.	0.00790
Conbined Conc:	0.00340
Standard:	0.00460
Percent Change	3.0%

Assumptions:
1. Critical low flow is from previous wasteload prepaired by Dr. Moellmer.
2. Selenium concentration of receiving water is based on a 7 year average of data collected at 7800 South, Storet Number 4994170.

Level I Antidegradation Review

Existing Project Loading	None	lbs/day
Proposed Project Loading	0.0659	lbs/day
% Increase in Project Loading	0.0%	
Current Stream Pollutant Load	1.2451	lbs/day
Proposed Stream Pollutant Lo	1.3110	lbs/day
% Increase in Stream Loading	5.3%	
Current Stream Pollutant Conc.	0.0033	mg/l
Proposed Stream Pollutant Co	0.0034	mg/l
% Increase in Stream Conc.	3.0%	



APPENDIX 3

A Tutorial: Utah Pollution Discharge Elimination System (UPDES) Permitting and Water Quality Standards: March 2013

A Tutorial: Utah Pollution Discharge Elimination System (UPDES) Permitting and Water Quality Standards
March 2013

The following is a brief tutorial on the application of water quality standards to permit limits in Utah Pollution Discharge Elimination System permits. The intent of this tutorial is to provide a simplified overview of the process. The overview begins by describing different types of effluent limits that a permit may have and their regulatory bases. Water quality standards and their application to permits are then described.

Permits must consider the impact of discharges on the quality of the receiving water because discharges may not cause an exceedance of water quality standards. Final permit limits are the most restrictive of secondary treatment limits (UAC R317-1-3.2), categorical limits (for instance, R317-8-3.12), or limits necessary to ensure compliance with water quality standards (UAC R317-8-4.2(4)). Effluent limits based on water quality standards are called "water-quality-based effluent limits."

Utah's water quality standards include: designated uses, criteria, and antidegradation and their role in permitting is described in the following paragraphs.

Uses
Designated uses identify the specific activities that the water quality is intended to support. Utah's designated uses include drinking water source, contact recreation such as swimming, aquatic life such as fish and waterfowl, and agriculture (UAC R317-2-6). All waters of the State have designated uses assigned. In addition to designated uses, existing uses[9] must also be protected. Currently, no existing uses have been identified for Utah waters that are not already included as designated uses.

Criteria
Utah's criteria include both numeric criteria (UAC R317-2-14) and Narrative Standards (UAC R317-2-7.2). Numeric criteria are typically expressed as a concentration in water that will protect and support the designated uses. Numeric criteria to protect aquatic life such as waterfowl typically include magnitude (concentration), duration (time period at the concentration commonly set either 1 hour for acute and 4 hours for chronic), and frequency (how often the numeric criteria could be exceeded with no significant effect on the designated use, commonly set to once every 3 years).

The narrative standard is explicitly stated in the permit. The narrative standard is a general prohibition for releasing anything to the water that impairs the designated uses. The Narrative Standards are applied in tandem when numeric criteria are available or alone when numeric criteria are not available.

Determining appropriate effluent limits for permits is relatively straightforward when numeric criteria are available. Through a mathematical modeling process called a waste load allocation, the amount of a pollutant that can be added to the water without exceeding the criterion is calculated. This calculation is based on the concentration of the pollutant that is already present in the receiving water, how much of the receiving water that is available for mixing, and the quantity of effluent that will be discharged. This calculation is done for all pollutants with numeric criteria. The results of the waste load analysis are then compared to the measured or projected effluent concentrations. Pollutants with "reasonable potential", that is, reasonable potential to cause or contribute to an exceedance of the criterion, must have effluent limits in the permit (R317-8-4.2(4)). Pollutants that don't have reasonable potential are not required to have water-quality-based effluent limits but may have monitoring requirements. One reason for monitoring is to provide the data to support a "reasonable potential" determination.

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9 Existing uses are uses actually attained in a water body on or after November 28, 1975, whether or not they UAC R317-8-4.2(4)(a)6.are included in the water quality standards (UAC R317-2-1).

Similar to numeric criteria, pollutants that trigger reasonable potential for the Narrative Standards must have water-quality-based effluent limits in the permit (UAC R317-8-4.2(4)(a)6.). Deriving effluent limits based on the non-numeric Narrative Standards is effluent and facility specific. The rationale for these limits should be documented in the permit Statement of Basis. Permit limits for oil and grease are a common example where the permit includes water-quality-based effluent limits based on the Narrative Standards.

Whole effluent toxicity (WET) testing permit requirements are another tool for evaluating and ensuring compliance with the Narrative Standards. These tests are conducted by exposing standard test organisms to the effluent in a laboratory setting and recording their responses. Whole effluent toxicity is a term used to describe the aggregate toxic effect of the effluent as measured by an organism's response upon exposure to the sample (e.g., lethality, impaired growth or reproduction). These tests replicate the total effect and actual environmental exposure of aquatic life to toxic pollutants in an effluent without requiring the identification of the specific pollutants. Note that WET monitoring and WET limits are not the same thing. A permit may contain WET monitoring requirements and must have WET limits if the results of the WET monitoring trigger reasonable potential (R317-8-4.2(4)a.5.).

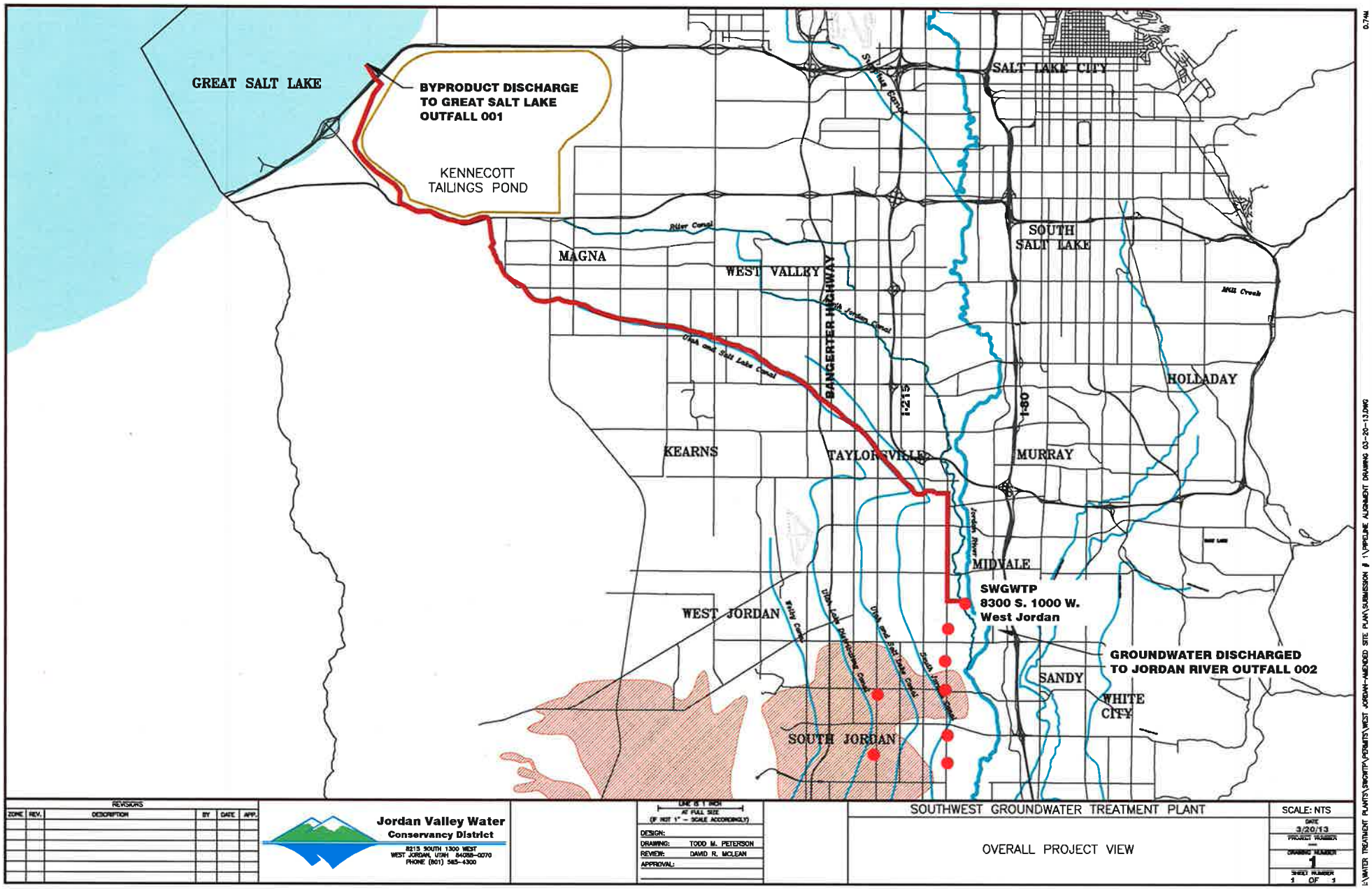
Antidegradation

Antidegradation is intended to conserve assimilative capacity[10]. Degradation of water quality is only allowed for important social or economic reasons and the least degrading, feasible treatment option is required (UAC R317-2-3). Note that degradation is defined as in increase in pollutant concentrations in the receiving waters. Pollutant concentrations may be allowed to increase as long as they remain below the numeric criteria and meet the requirements of the Narrative Standards.

10 "Assimilative Capacity" means the difference between the numeric criteria and the concentration in the waterbody of interest where the concentration is less than the criterion (UAC R317-1-1).

APPENDIX 4

Map of Proposed Discharge Locations and Pipeline Alignment



REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

Jordan Valley Water Conservancy District
8215 SOUTH 1300 WEST
WEST JORDAN, UTAH 84088-0070
PHONE (801) 565-4300

LINE IS 1 INCH AT FULL SIZE (IF NOT 1" – SCALE ACCORDINGLY)

DESIGN:
DRAWING: TODD M. PETERSON
REVIEW: DAVID R. MCLEAN
APPROVAL:

SOUTHWEST GROUNDWATER TREATMENT PLANT

OVERALL PROJECT VIEW

SCALE: NTS
DATE: 3/20/13
PROJECT NUMBER
DRAWING NUMBER: 1
SHEET NUMBER: 1 OF 1

L:\WATER TREATMENT PLANTS\SWGWTP\PERMITS\WEST JORDAN-AMENDED SITE PLAN\SUBMISSION # 1\PIPELINE ALIGNMENT DRAWING 03-20-13.DWG

Permit No. UT0025836
Major Industrial

STATE OF UTAH
DIVISION OF WATER QUALITY
DEPARTMENT OF ENVIRONMENTAL QUALITY
SALT LAKE CITY, UTAH

AUTHORIZATION TO DISCHARGE UNDER THE

UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM
(UPDES)

In compliance with provisions of the Utah *Water Quality Act, Title 19, Chapter 5, Utah Code Annotated ("UCA") 1953, as amended* (the *"Act"*),

JORDAN VALLEY WATER CONSERVANCY DISTRICT

is hereby authorized to discharge from its facility located in West Jordan in Salt Lake County, Utah, with the outfalls located at the following:

Outfall	Latitude	Longitude	To receiving waters named
001	40°45'37.59"N	112°10'13.32"W	Transitional Waters and Gilbert Bay of Great Salt Lake
002	40°36'5.58"N	111°55'13.37"W	Jordan River

in accordance with discharge points, effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on April 1, 2014

This permit expires at midnight, March 31, 2019

Signed the 7th day of March, 2014

John J. Whitehead
Acting Director

TABLE OF CONTENTS

I. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Definitions.

1. The "30-day and monthly average" is the arithmetic average of all samples collected during a consecutive 30-day period or calendar month whichever is applicable. The calendar month shall be used for purposes of reporting self-monitoring data on discharge monitoring report forms.

2. "Daily Maximum" ("Daily Max.") is the maximum value allowable in any single sample or instantaneous measurement.

3. A "grab" sample, for monitoring requirements, is defined as a single "dip and take" sample collected at a representative point in the discharge stream.

4. An "instantaneous" measurement, for monitoring requirements, is defined as a single reading, observation, or measurement.

5. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

6. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

7. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

8. "Director" means Director of the Utah Division of Water Quality.

9. "EPA" means the United States Environmental Protection Agency.

10. "Act" means the "*Utah Water Quality Act*".

11. "Best Management Practices" ("*BMP's*") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the State. *BMP's* also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

12. "*CWA*" means *The Federal Water Pollution Control Act*, as amended, by *The Clean Water Act of 1987.*

13. "Point Source" means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharges. This term does not include return flows from irrigated agriculture or agriculture storm water runoff.

14. "Significant spills" includes, but is not limited to: releases of oil or hazardous substances in excess of reportable quantities under *Section 311* of the *Clean Water Act* (see *40 CFR 110.10* and *40 CFR 117.21*) or *Section 102* of *CERCLA* (see *40 CFR 302.4*).

15. "Acute toxicity" occurs when 50 percent or more mortality is observed for either test species at any effluent concentration (lethal concentration or "LC_{50}").

16. "Chronic toxicity" occurs when the survival, growth, or reproduction for either test species exposed to a specific percent effluent dilution is significantly less (at the 95 percent confidence level) than the survival, growth, or reproduction of the control specimens.

17. "IC25" is the concentration of toxicant (given in % effluent) that would cause a 25% reduction in mean young per female, or a 25% reduction in overall growth for the test population.

18. "Composite Samples" shall be flow proportioned. The composite sample shall, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample shall not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

    (a) Constant time interval between samples, sample volume proportional to flow rate at time of sampling;

    (b) Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;

    (c) Constant sample volume, time interval between samples proportional to flow (i.e., sample taken every "X" gallons of flow); and,

    (d) Continuous sample volume, with sample collection rate proportional to flow rate.

B. Description of Discharge Point.

The authorization to discharge provided under this permit is limited to those outfalls specifically designated below as discharge locations. Discharges at any location not authorized under a UPDES permit are in violation of the *Act* and may be subject to penalties under the *Act*. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge may be subject to criminal penalties as provided under the *Act*.

Outfall Number	Location of Discharge Point(s)
001	Located at latitude 40°45'37.59"N and longitude 112°10'13.32"W. This outfall will convey byproduct and excess untreated groundwater from the deep aquifer. The discharge is through a 16-inch diameter pipe directly to the Transitional Waters and Gilbert Bay of the Great Salt Lake. The compliance monitoring point is at the Southwest Groundwater Treatment Plant prior to effluent entering the 21 mile byproduct pipeline. (Except for end of pipe monitoring as required in *Part I.D. Self Monitoring and Reporting Requirements, Footnotes b/ and e/* of the UPDES permit.)
002	Located at latitude 40°36'5.58"N and longitude 111°55'13.37"W. The discharge will consist only of untreated shallow aquifer groundwater that has not been impacted by mining activities through a 30-inch diameter pipe from the river discharge vault at the Southwest Groundwater Treatment Plant to the Jordan River.

C. Narrative Standard.

It shall be unlawful, and a violation of this permit, for the permittee to discharge or place any waste or other substance in such a way as will be or may become offensive such as unnatural deposits, floating debris, oil, scum, or other nuisances such as color, odor or taste, or cause conditions which produce undesirable aquatic life or which produce objectionable tastes in edible aquatic organisms; or result in concentrations or combinations of substances which produce undesirable physiological responses in desirable resident fish, or other desirable aquatic life, or undesirable human health effects, as determined by bioassay or other tests performed in accordance with standard procedures.

D. Specific Limitations and Self-monitoring Requirements.

1. Effective immediately and lasting the duration of this permit, there shall be no toxics in toxic amounts from Outfalls 001 and 002 as determined by test procedures described in *Part I.D.* of this permit.

2. Effective immediately and lasting the duration of this permit, the permittee is authorized to discharge from Outfalls 001 and 002. Such discharges shall be limited and monitored by the permittee as specified below:

Parameter	Effluent Limitations Outfall 001 a/b/c/d/e/				
	Max Monthly Average	Max Weekly Average	Daily Min	Daily Max	Annual Max
Total Flow, MGD f/g/	3.0				
Selenium, total, mg/L				0.054	
Selenium, kg/year					224
Selenium h/					
TSS, mg/L	25	35		70	
Mercury, kg/yr i/j/					0.38
Oil & Grease, mg/L				10	
pH, Standard Units			6.5	9.0	
WET, Chronic Biomonitoring, Both Species				Pass IC_{25} (EOP)	

a/ See definitions Part I.A. for definition of terms.

b/ All parameters in this table will be reported monthly in the monthly Discharge Monitoring Report.

c/ Metals samples should be analyzed using a method that meets MDL requirements. If a test method is not available the permittee must submit documentation to the Director regarding the method that will be used. The sample type (composite or grab) should be performed according to the methods requirements.

d/ There shall be no visible sheen or floating solids or visible foam in other than trace amounts.

e/ There shall be no discharge of sanitary wastes.

f/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.

g/ The flow rates and durations of all discharges shall be reported in the Annual Project Operating Report.

h/ Implementation of the selenium water quality standard of 12.5 mg/kg for Gilbert Bay of the GSL is outlined in Part I.D.8 of this UPDES Permit.

i/ Mercury samples must be analyzed using Method 1631 or other sufficiently sensitive method. The sample type (composite or grab) should be performed according to the method's requirements.

j/ This load constitutes 1% of the annual mercury load entering the GSL from all sources for this parameter and may change once the aquifer is fully characterized or other information on the effluent or receiving water becomes available.

Parameter	Effluent Limitations Outfall 002 a/b/c/d/e/				
	Max Monthly Average	Max Weekly Average	Daily Min	Daily Max	Annual Max
TDS, mg/L				1,200	
Selenium, total, kg/yr					26.4
Selenium, mg/L				0.027	
TSS, mg/L	25	35		70	
Oil & Grease, mg/L				10	
pH, Standard Units			6.5	9.0	
WET, Acute Biomonitoring, both species				Pass LC_{50} (EOP)	

a/ See definitions Part I.A. for definition of terms.

b/ All of the parameters in the above table, shall be reported monthly in the Discharge Monitoring Report.

c/ Metals samples should be analyzed using a method that meets MDL requirements. If a test method is not available the permittee must submit documentation to the Director regarding the method that will be used. The sample type (composite or grab) should be performed according to the methods requirements.

d/ There shall be no visible sheet or floating solids or visible foam in other than trace amounts.

e/ There shall be no discharge of sanitary wastes.

Self-Monitoring and Reporting Requirements, Outfall 001 a/b/c/			
Parameter	Frequency	Sample Type	Units
Total Flow	Daily or Continuous	Measured	MGD
Total Mercury	Monthly	Composite or Grab	ng/L
Total Mercury d/	Monthly	Calculated	kg/yr
Total Selenium	2 x Weekly	Composite or Grab	mg/L
Total Selenium d/	Monthly	Calculated	kg/yr
TSS e/	2 x Weekly	Composite or Grab	mg/L
Selenium	Annually	Bird Eggs	mg/kg
Oil & Grease	Monthly if sheen is observed	Grab	mg/L
pH	Monthly	Grab	SU
WET, Chronic Biomonitoring	Quarterly, alternating species	Composite	Pass/fail

a/ See definitions Part I.A. for definition of terms.

b/ Jordan Valley shall also monitor all parameters and BOD_5, quarterly at the end of pipe for the first year of operation and then bi-annually thereafter. If lake levels rise where monitoring at end of pipe is not feasible, then Jordan Valley may petition the Director to establish an alternate sampling point.

c/ Mercury samples must be analyzed using Method 1631 or other sufficiently sensitive method. The sample type (composite or grab) should be performed according to the methods requirements

d/ Cumulative totals for these parameters shall be reported on the monthly Discharge Monitoring Reports.

e/ Monitoring of this parameter is required at end of pipe during pipeline cleaning operations. Monitoring results must be included with the DMR for that monitoring period. If lake levels rise where monitoring at end of pipe is not feasible, then Jordan Valley may petition the Director to establish an alternate sampling point.

Self-Monitoring and Reporting Requirements, Outfall 002 a/b/c/			
Parameter	Frequency	Sample Type	Units
Total Flow	Daily or Continuous	Measured	MGD
TDS	2 x Weekly	Composite or Grab	mg/L
Total Selenium	2 x Weekly	Composite or Grab	mg/L
Total Selenium d/	Annually	Calculated	kg/yr
TSS	2 x Weekly	Composite or Grab	mg/L
Mercury	Monthly	Composite or Grab	ng/L
Oil & Grease	2 x Weekly, if sheen is observed	Grab	mg/L
pH	2 x Weekly	Grab	SU
WET, Acute Biomonitoring	Quarterly, both species	Composite	Pass/Fail

a/ See definitions Part I.A. for definition of terms.

b/ Mercury samples must be analyzed using Method 1631 or other sufficiently sensitive method. The sample type (composite or grab) should be performed according to the methods requirements.

c/ Flow measurements of effluent volume shall be made in such a manner that the permittee can affirmatively demonstrate that representative values are being obtained.

d/ Cumulative totals for this parameter shall be reported on the monthly Discharge Monitoring Reports.

3. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following locations: 001 shall be monitored at the Southwest Groundwater Treatment Plant prior to the effluent entering the byproduct pipeline and 002 shall be monitored prior to mixing with any receiving water.

4. ***Annual Project Operating Report for Pump to Waste, Upset Discharges and Cleaning and Maintenance Conditions for the Shallow Wells***: On an annual basis, Jordan Valley will summarize the duration and frequency of all pump to waste discharges, discharges associated with cleaning and maintenance of the RO unit and any discharges resulting from facility upset conditions that occurred during that calendar year. This summary will be submitted to the DWQ by February 1st of the following year.

5. ***Deep Aquifer Compliance Schedule:*** The permittee shall submit to the DWQ a sampling and analysis plan for characterization of the mercury concentration in the deep aquifer for approval within three months of the effective date of this permit. The characterization and a summary of the findings and all supporting water quality data shall be submitted to the DWQ within one year of the Southwest Groundwater Treatment Plant becoming operational.

6. ***Joint Discharge Area Transitional Waters Monitoring Program:*** Jordan Valley is required to annually sample eight (8) bird eggs, if available, but not to exceed 20% of available eggs, during the nesting season, April 15 through June 30, for the current permit cycle. The eggs will be collected from bird nests in the joint Jordan Valley Outfall 001 and Kennecott Outfall 012 affected outfall area. These samples will be subject to the tissue based selenium water quality standard of 12.5 mg/kg dry weight for Gilbert Bay of Great Salt Lake to demonstrate compliance with the Narrative Standard. Jordan Valley must notify the Director within 7 business days of becoming aware of any egg concentrations that exceed 9.8 mg/kg. In addition, total mercury concentrations in the egg tissue samples must also be evaluated and reported by Jordan Valley.

   Jordan Valley will conduct annual bird surveys approximately every two weeks between April 15 and June 30 (four times per season) to document bird abundance, diversity, and use of the Outfall 001 mud flat habitat, particularly for evidence of feeding and nesting using methodology approved by the Director. This data will be submitted in the Annual Project Operating Report.

   Jordan Valley is required to annually collect co-located macroinvertebrate, water and sediment samples once between April 15 and June 30 and as close in time as practical to the bird egg collection. These samples will be analyzed for selenium, biota and sediment will also be analyzed for total mercury, water samples will be analyzed for methyl and total mercury. The co-located macroinvertebrates, sediment and water samples will be collected at up to six (6) evenly spaced locations along the discharge watercourse from the discharge point to the waters edge from where Outfall 001 enters the standing waters of Great Salt Lake.

   Jordan Valley is required to biannually collect co-located brine shrimp and water samples twice per year from the open waters of Gilbert Bay in the vicinity of the outfall. Jordan Valley is required to submit an addendum to the Sampling Plan for approval by the Director within 90 days of issuance of this permit that includes the sampling methods and geographic coordinates to define the sampling area. Sample collection is constrained by brine shrimp dynamics in the sampling area as brine shrimp may not always be present when sampling is attempted. The Sampling Plan addendum will also include the minimum number of days that sampling will be attempted. The intent is to collect brine shrimp samples as close as available to where the effluent waters enter Gilbert Bay between April 15 and June 30 and in October. The water sample will be analyzed for total and methyl mercury and selenium. The brine shrimp sample will be analyzed for total mercury and selenium.

DWQ strongly recommends that Jordan Valley coordinate with other facilities that discharge in the same delta to avoid needless duplication and further impact to avian wildlife in the delta area. Other monitoring requirements may be shared if appropriate. The Director shall be notified as soon as possible, but no later than April 1, if the efforts to coordinate monitoring with other dischargers to the delta area are unsuccessful. The detailed field and laboratory data, analysis and a summary of the results from the bird surveys, egg samples and co-located water, sediment and macroinvertibrates' monitoring must be submitted to the DWQ by February 1, or another agreed upon date, following the end of the calendar year for which the results were obtained as a part of the Annual Project Operating Report.

7. ***Mercury Monitoring of Byproduct Pipeline:*** Upon the commencement of operations at the Southwest Groundwater Treatment Plant, Jordan Valley shall monitor the methyl mercury and total mercury concentrations of the byproduct in April and June of each year at the following monitoring locations: prior to entering the byproduct pipeline and at the end of pipeline (Outfall 001) prior to mixing with the receiving water. The analysis must be submitted with the DMR following the monitoring period.

8. ***Implementation of the 12.5 mg/kg Se Tissue Based Standard:*** Jordan Valley is subject to the following actions when the annual geometric mean dry weight concentrations outlined below exist in bird eggs collected as part of the approved *Joint Discharge Area Transitional Waters Monitoring Program*:

   9.8 to 12.4 mg/kg Se and above: Jordan Valley will prepare and implement a plan to decrease bird exposures to Se from the effluent unless Jordan Valley can demonstrate to the Director's satisfaction that the discharge is not the cause of the increasing Se concentrations in eggs. The plan, including an implementation schedule, must be approved by the Director within 180 days of notice that this condition exists.

   12.5 mg/kg Se and above: The reopener provision for this permit will be exercised and Jordan Valley will be subject to additional Se reductions unless Jordan Valley can demonstrate to the Director's satisfaction that the discharge is not the cause of the Se exceedances in eggs. If these waters are determined to be impaired, Jordan Valley may be subject to additional Se reductions under the TMDL process.

11. Whole Effluent Toxicity (WET) Testing.

   a. *Whole Effluent Testing – Acute Toxicity.* Beginning with the start-up of the treatment plant, the permittee shall conduct quarterly acute static replacement toxicity tests on a composite sample from the end of pipe (EOP) of the final effluent. The sample shall be collected at Outfall 002.

      The monitoring frequency for acute tests shall be quarterly unless a sample is found to be acutely toxic during a routine test. If that occurs, the monitoring frequency shall become weekly (See *Part I.8.b, Accelerated Testing*). Samples shall be collected on a two day progression; i.e., if the first sample is on a

Monday, during the next sampling period, the sampling shall begin on a Wednesday, etc.

The replacement static acute toxicity tests shall be conducted in accordance with the procedures set out in the latest revision of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, 5th Edition, (EPA 821/R/02/012), October 2002,* as per *40 CFR 136.3(a) TABLE 1A-LIST OF APPROVED BIOLOGICAL METHODS.* The permittee shall conduct the 48-hour static replacement toxicity test using Ceriodaphnia dubia and the acute 96-hour static replacement toxicity test using Pimephales promelas (fathead minnow).

Acute toxicity occurs when 50 percent or more mortality is observed for either species at any effluent concentration (LC_{50}). Mortality in the control must simultaneously be 10 percent or less for the results to be considered valid. If more than 10 percent control mortality occurs, the test shall be repeated until satisfactory control mortality is achieved. A variance to this requirement may be granted by the Director if a mortality of less than 10 percent was observed in higher effluent dilutions.

Quarterly test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the reporting calendar quarter e.g., biomonitoring results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining biomonitoring reports submitted with DMRs due each July 28, October 28, and January 28). All test results shall be reported along with the DMR submitted for that reporting period. The format for the report shall be consistent with the latest revision of the *Region VIII Guidance for Acute Whole Effluent Reporting (August, 1997)* and shall include all chemical and physical data as specified.

If the results for a minimum of ten consecutive tests for each test species indicate no acute toxicity, the permittee may request a reduction in testing frequency and/or reduction of test species. The Director may approve, partially approve, or deny the request based on results and other available information. If approval is given, the modification will take place without a public notice.

b. *Whole Effluent* Testing – *Chronic Toxicity*. Beginning with the start-up of the treatment plant, the permittee shall quarterly conduct short-term toxicity tests on a composite sample of the final effluent. The sample shall be collected at Outfall 001.

The monitoring frequency for Chronic WET testing shall be quarterly. Samples shall be collected on a two-day progression; i.e., if the first sample is on a Monday, during the next sampling period, sampling shall be on a Wednesday. If chronic toxicity is detected, the test shall be repeated in less than four weeks from the date the initial sample was taken. The need for any additional

samples, and/or a Toxicity Reduction Evaluation (TRE), see Part I.C.11.f, shall be determined by the Director. If the second test shows no chronic toxicity, routine monitoring shall be resumed.

The chronic toxicity tests shall be conducted in general accordance with the procedures set out in the latest revision of *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. Third Edition. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA 821–R–02–014, and the Region VIII EPA NPDES Chronic Test Conditions - Static Renewal Whole Effluent Toxicity Test (August, 1997).* Test species shall consist of *Americamysis bahia* (mysid shrimp) and *Cyprinodon variegatus* (sheepshead minnow). A CO2 atmosphere may be used (in conjunction with an unmodified test) in order to account for artificial pH drift, as previously demonstrated to and authorized by the Director.

Chronic toxicity occurs when the survival, growth, or reproduction for either test species, when exposed to a concentration of 100 percent effluent, is significantly less (at 95% confidence level) than that of the control specimens. Concentrations of 100 percent effluent only will be required, plus the control. If any of the acceptable control performance criteria are not met, the test shall be considered invalid. IC25 is the inhibition concentration of toxicant (given in % effluent) that would cause a 25% reduction in mean young per female, or a 25% reduction in overall growth for the test population.

Quarterly test results shall be reported along with the Discharge Monitoring Report (DMR) submitted for the end of the reporting calendar quarter (e.g., biomonitoring results for the calendar quarter ending March 31 shall be reported with the DMR due April 28, with the remaining biomonitoring reports submitted with DMRs due each July 28, October 28, and January 28). All test results shall be reported along with the DMR submitted for that reporting period. The format for the report shall be consistent with the latest revision of the Region VIII Guidance for Chronic Whole Effluent Reporting (August, 1997) and shall include all the physical testing as specified.

If the results for a minimum of ten consecutive tests indicate no chronic toxicity, the permittee may request a reduction in testing frequency and/or reduction to one species. The Director may approve, partially approve, or deny the request based on results and other available information. If approval is given, the modification will take place without a public notice.

The current Utah whole effluent toxicity (WET) policy is in the process of being updated and revised to assure its consistency with the Environmental Protection Agency's national and regional WET policy. When said revised WET policy has been finalized and officially adopted, this permit will be reopened and modified to incorporate satisfactory follow-up chronic toxicity

language (chronic pattern of toxicity, PTI and/or TIE/TRE, etc.) without a public notice, as warranted and appropriate.

c. *Accelerated* Testing. When acute toxicity is indicated during routine biomonitoring as specified in this permit, the permittee shall notify the Director in writing within five (5) days after becoming aware of the test result. The permittee shall perform an accelerated schedule of biomonitoring to establish whether a pattern of toxicity exists. Accelerated testing will begin within seven (7) days after the permittee becomes aware of the test result. Accelerated testing shall be conducted as specified under *Part I.C.3.c., Pattern of Toxicity*. If the accelerated testing demonstrates no pattern of toxicity, routine monitoring shall be resumed.

d. *Pattern of Toxicity*. A pattern of toxicity is defined by the results of a series of up to five (5) biomonitoring tests pursuant to the accelerated testing requirements using 100 percent effluent on the single species found to be more sensitive, once every week for up to five (5) consecutive weeks.

If two (2) consecutive tests (not including the scheduled quarterly or monthly test which triggered the search for a pattern of toxicity) do not result in acute toxicity, no further accelerated testing will be required and no pattern of toxicity will be found to exist. The permittee will provide written verification to the Director within five (5) days, and resume routine monitoring.

A pattern of toxicity is established if one of the following occurs:

(1) If two (2) consecutive test results (not including the scheduled quarterly or monthly test, which triggered the search for a pattern of toxicity) indicate acute toxicity, this constitutes an established pattern of toxicity.

(2) If consecutive tests continue to yield differing results each time, the permittee will be required to conduct up to a maximum of five (5) acute tests (not including the scheduled quarterly or monthly test which triggered the search for a pattern of toxicity). If three out of five test results indicate acute toxicity, this will constitute an established pattern of toxicity.

e. *Preliminary* Toxicity *Investigation.*

(1) When a pattern of toxicity is detected the permittee will notify the Director in writing within five (5) days and begin an evaluation of the possible causes of the toxicity. The permittee will have fifteen (15) working days from demonstration of the pattern to complete a Preliminary Toxicity Investigation (PTI) and submit a written report of the results to the Director. The PTI may include, but is not limited to, additional chemical and biological monitoring, examination of

pretreatment program records, examination of discharge monitoring reports, a thorough review of the testing protocol, evaluation of treatment processes and chemical use, inspection of material storage and transfer areas to determine if a spill may have occurred, and similar procedures.

(2) If the PTI identifies a probable toxicant and/or a probable source of toxicity the permittee shall submit, as part of its final results written notification of that effect to the Director. Within thirty (30) days of completing the PTI the permittee shall submit for approval a control program to control effluent toxicity and shall proceed to implement such a plan within seven (7) days following approval. The control program, as submitted to or revised by the Director, may be incorporated into the permit.

(3) If no probable explanation for toxicity is identified in the PTI, the permittee shall notify the Director as part of its final report, along with a schedule for conducting a Phase I Toxicity Reduction Evaluation (TRE) (See *Part I.C.3.e., Toxicity Reduction Evaluation*).

If toxicity spontaneously disappears during the PTI, the permittee shall submit written notification to that effect to the Director as part of the reporting requirements of paragraph a. of this section.

f. *Toxicity Reduction Evaluation (TRE).* If toxicity is detected during the life of this permit and it is determined by the Director that a TRE is necessary, the permittee shall be so notified and shall initiate a TRE immediately thereafter. The purpose of the TRE will be to establish the cause of toxicity, locate the source(s) of the toxicity, and control or provide treatment for the toxicity.

A TRE may include but is not limited to one, all, or a combination of the following:

(1) Phase I – Toxicity Characterization
(2) Phase II – Toxicity Identification Procedures
(3) Phase III – Toxicity Control Procedures
(4) Any other appropriate procedures for toxicity source elimination and control.

If the TRE establishes that the toxicity cannot be immediately eliminated, the permittee shall submit a proposed compliance plan to the Director. The plan shall include the proposed approach to control toxicity and a proposed compliance schedule for achieving control. If the approach and schedule are acceptable to the Director, this permit may be reopened and modified.

If the TRE shows that the toxicity is caused by a toxicant(s) that may be controlled with specific numerical limitations, the permittee may:

(1) Submit an alternative control program for compliance with the numerical requirements.
(2) If necessary, provide a modified biomonitoring protocol, which compensates for the pollutant(s) being controlled numerically.

If acceptable to the Director, this permit may be reopened and modified to incorporate any additional numerical limitations, a modified compliance schedule if judged necessary by the Director, and/or a modified biomonitoring protocol.

Failure to conduct an adequate TRE, or failure to submit a plan or program as described above, or the submittal of a plan or program judged inadequate by the Director, shall be considered a violation of this permit.

D. Reporting of Discharge Monitoring Results. Monitoring results obtained during the previous month shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), post-marked no later than the 28th day of the month following the completed reporting period. The first report is due on May 28, 2014. If no discharge occurs during the reporting period, "no discharge" shall be reported. Legible copies of these, and all other reports including whole effluent toxicity (WET) test reports and the annual Project Operating Report required herein, shall be signed and certified in accordance with the requirements of *Signatory Requirements (see Part VII.G)*, and submitted to the Division of Water Quality at the following address:

Department of Environmental Quality
Division of Water Quality
195 North 1950 West
PO Box 144870
Salt Lake City, Utah 84114-4870

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling. Samples taken in compliance with the monitoring requirements established under *Part I* shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

B. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under *Utah Administrative Code ("UAC") R317-2-10*, unless other test procedures have been specified in this permit.

C. Penalties for Tampering. The *Act* provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

D. Reporting of Monitoring Results. Monitoring results obtained during the previous month shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), post-marked no later than the 28th day of the month following the completed reporting period. The first report is due on May 28, 2014. If no discharge occurs during the reporting period, "no discharge" shall be reported. Legible copies of these, and all other reports required herein, shall be signed and certified in accordance with the requirements of *Signatory Requirements (see Part V.G)*, and submitted to the Director, Division of Water Quality and to EPA at the following addresses:

Original to: Department of Environmental Quality
Division of Water Quality
195 North 1950 West
PO Box 144870
Salt Lake City, Utah 84114-4870

E. Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any Compliance Schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Additional Monitoring by the Permittee. If the permittee monitors any parameter more frequently than required by this permit, using test procedures approved under *UAC R317-2-10* or as otherwise specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated. Only those parameters required by the permit need to be reported.

G. Records Contents. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements:
2. The individual(s) who performed the sampling or measurements;
3. The date(s) and time(s) analyses were performed;

4. The individual(s) who performed the analyses;
5. The analytical techniques or methods used; and,
6. The results of such analyses.

H. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time. A copy of this UPDES permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting.

1. The permittee shall (orally) report any noncompliance which may seriously endanger health or environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of circumstances. The report shall be made to the Division of Water Quality, (801) 536-4300, or 24 hour answering service (801) 536-4123.

2. The following occurrences of noncompliance shall be reported by telephone (801) 536-4123 as soon as possible but no later than 24 hours from the time the permittee becomes aware of the circumstances:

   a. Any noncompliance which may endanger health or the environment;

   b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See *Part IV.G, Bypass of Treatment Facilities.)*;

   c. Any upset which exceeds any effluent limitation in the permit (See *Part IV.H, Upset Conditions.*); or,

   d. Violation of a maximum daily discharge limitation for any of the pollutants listed in the permit.

3. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected;

d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance;

e. Steps taken, if any, to mitigate the adverse impacts on the environment and human health during the noncompliance period.

4. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Division of Water Quality, (801) 536-4300.

5. Reports shall be submitted to the addresses in *Part III.D, Reporting of Monitoring Results*.

J. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for *Part III.D* are submitted. The reports shall contain the information listed in *Part III.I.3*.

K. Inspection and Entry. The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and,

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the *Act*, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions. The *Act* provides that any person who violates a permit condition implementing provisions of the *Act* is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions of the Act is subject to a fine not exceeding $25,000 per day of violation; Any person convicted under *UCA 19-5-115(2)* a second time shall be punished by a fine not exceeding $50,000 per day. Except as provided at *Part IV.G, Bypass of Treatment Facilities* and *Part IV.H, Upset Conditions*, nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F. Removed Substances. Collected screening, grit, solids, sludges, or other pollutants removed in the course of treatment shall be buried or disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard. Sludge/digester supernatant and filter backwash shall not directly enter either the final effluent or waters of the state by any other direct route.

G. Bypass of Treatment Facilities.

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to 2. and 3. of this section.

2. Prohibition of Bypass.

a. Bypass is prohibited, and the Director may take enforcement action against a permittee for bypass, unless:

(1) Bypass was unavoidable to prevent loss of human life, personal injury, or severe property damage;

(2) There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance, and

(3) The permittee submitted notices as required under section G.3.

b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed in sections G.2a. (1), (2) and (3).

3. Notice.

a. Anticipated bypass. Except as provided above in section G.2. and below in section G. 3.b, if the permittee knows in advance of the need for a bypass, it shall submit prior notice, at least ninety days before the date of bypass. The prior notice shall include the following unless otherwise waived by the Director:

(1) Evaluation of alternative to bypass, including cost-benefit analysis containing an assessment of anticipated resource damages:

(2) A specific bypass plan describing the work to be performed including scheduled dates and times. The permittee must notify the Director in advance of any changes to the bypass schedule;

(3) Description of specific measures to be taken to minimize environmental and public health impacts;

(4) A notification plan sufficient to alert all downstream users, the public and others reasonably expected to be impacted by the bypass;

(5) A water quality assessment plan to include sufficient monitoring of the receiving water before, during and following the bypass to enable evaluation of public health risks and environmental impacts; and

(6) Any additional information requested by the Director.

b. Emergency Bypass. Where ninety days advance notice is not possible, the permittee must notify the Director, and the Director of the Department of Natural Resources, as soon as it becomes aware of the need to bypass and provide to the Director the information in section G.3.a.(1) through (6) to the extent practicable.

c. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass to the Director as required under Part III.I., Twenty Four Hour Reporting. The permittee shall also immediately notify the Director of the Department of Natural Resources, the public and downstream users and shall implement measures to minimize impacts to public health and environment to the extent practicable.

H. Upset Conditions.

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of paragraph 2. of this section are met. Director's administrative determination regarding a claim of upset cannot be judiciously challenged by the permittee until such time as an action is initiated for noncompliance.

2. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

a. An upset occurred and that the permittee can identify the cause(s) of the upset;

b. The permitted facility was at the time being properly operated;

c. The permittee submitted notice of the upset as required under Part III.I, Twenty-four Hour Notice of Noncompliance Reporting; and,

d. The permittee complied with any remedial measures required under Part IV.D, Duty to Mitigate.

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

I. Toxic Pollutants. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of *The Water Quality Act of 1987* for toxic pollutants within

the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

J. Changes in Discharge of Toxic Substances. Notification shall be provided to the Director as soon as the permittee knows of, or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. One hundred micrograms per liter (100 ug/L);

   b. Two hundred micrograms per liter (200 ug/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/L) for 2, 4-dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

   c. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with *UAC R317-8-3.5(7)* or (10); or,

   d. The level established by the Director in accordance with *UAC R317-8-4.2(6)*.

2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. Five hundred micrograms per liter (500 ug/L);

   b. One milligram per liter (1 mg/L) for antimony:

   c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with *UAC R317-8-3.5(9)*; or,

   d. The level established by the Director in accordance with *UAC R317-8-4.2(6)*.

K. Industrial Pretreatment. Any wastewaters discharged to the sanitary sewer, either as a direct discharge or as a hauled waste, are subject to Federal, State and local pretreatment regulations. Pursuant to Section 307 of *The Water Quality Act of 1987*, the permittee shall comply with all applicable federal General Pretreatment Regulations promulgated at *40 CFR 403*, the State Pretreatment Requirements at *UAC R317-8-8*, and any specific local discharge limitations developed by the Publicly Owned Treatment Works (POTW) accepting the wastewaters.

In addition, in accordance with *40 CFR 403.12(p)(1)*, the permittee must notify the POTW, the EPA Regional Waste Management Director, and the State hazardous waste authorities, in writing, if they discharge any substance into a POTW which if otherwise disposed of would be considered a hazardous waste under *40 CFR 261*. This notification must include the name

of the hazardous waste, the EPA hazardous waste number, and the type of discharge (continuous or batch).

IV. GENERAL REQUIREMENTS

A. Planned Changes. The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit. In addition, if there are any planned substantial changes to the permittee's existing sludge facilities or their manner of operation or to current sludge management practices of storage and disposal, the permittee shall give notice to the Director of any planned changes at least 30 days prior to their implementation.

B. Anticipated Noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee shall apply for and obtain a new permit. The application shall be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

F. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director, it shall promptly submit such facts or information.

G. Signatory Requirements. All applications, reports or information submitted to the Director shall be signed and certified.

1. All permit applications shall be signed by either a principal executive officer or ranking elected official

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Director, and,

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)

3. Changes to authorization. If an authorization under paragraph V.G.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph V.G.2 must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports. The *Act* provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $10,000.00 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports. Except for data determined to be confidential under *UAC R317-8-3.2*, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of Director. As required by the *Act*, permit applications, permits and effluent data shall not be considered confidential

J. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the permittee of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under the *Act*.

K. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

L. Severability. The provisions of this permit are severable, and if any provisions of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

M. Transfers. This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 20 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and,

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

N. State Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by *UCA 19-5-117*.

O. Water Quality-Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations and compliance schedule, if necessary, if one or more of the following events occurs:

1. Water Quality Standards for the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit.

2. A final wasteload allocation is developed and approved by the State and/or EPA for incorporation in this permit.

3. A revision to the current Water Quality Management Plan is approved and adopted which calls for different effluent limitations than contained in this permit.

P. Toxicity Limitation-Reopener Provision. This permit may be reopened and modified (following proper administrative procedures) to include whole effluent toxicity (WET) testing, a WET limitation, a compliance schedule, a compliance date, additional or modified numerical limitations, or any other conditions related to the control of toxicants if toxicity is detected during the life of this permit.

Q. Storm Water-Reopener Provision. At any time during the duration (life) of this permit, this permit may be reopened and modified (following proper administrative procedures) as per *UAC R317.8*, to include, any applicable storm water provisions and requirements, a storm water pollution prevention plan, a compliance schedule, a compliance date, monitoring and/or reporting requirements, or any other conditions related to the control of storm water discharges to "waters-of-the-State".